TURBOCHEF

Accelerating the World of Cooking™

Service Manual

FOR THE TURBOCHEF 3240 HIGH H CONVEYOR OVEN

For further information, call

800.90TURBO
or
+1 214.379.6000

The information contained in this manual is important for the proper installation, use, maintenance, and repair of this oven. Follow these procedures and instructions to help ensure satisfactory baking results and years of trouble-free service.

Errors – descriptive, typographic, or pictorial – are subject to correction. Specifications are subject to change without notice.

PLEASE CAREFULLY READ THIS MANUAL AND RETAIN IT FOR FUTURE REFERENCE.

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Important Safety Information – Please Read First

Improper installation, adjustment, alteration, service, or maintenance of this equipment can cause property damage, injury, or death. Thoroughly read the installation, operating, and maintenance instructions before installing or servicing this equipment. Strictly adhere to the following safety information to reduce the risk of:

- Damage to the oven
- Damage to property near the oven
- Personal injury
- Burns
- Fire
- Electric shock

General Safety Information

- ✔ Use this appliance only for its intended uses as described in this manual.
- ✔ Only qualified service personnel should service this appliance. Contact the nearest authorized service facility for examination, repair, or adjustment.
- ✔ Always ensure the oven is disconnected from the power supply before servicing, repairing, or adjusting any components or parts.
- x DO NOT place the cord near heated surfaces.
- x DO NOT store or use flammable vapors or liquids (e.g., gasoline) in the vicinity of this appliance.
- x DO NOT allow children to use this appliance.
- x DO NOT place corrosive chemicals or vapors in this appliance. It is not designed for industrial or laboratory use.
- x DO NOT operate this appliance if it:
  - -Has a damaged cord, plug, or gas hose
  - -Is not working properly
  - -Has been damaged or dropped
- x DO NOT cover or block any openings on this appliance.
- x DO NOT store this appliance outdoors.
- x DO NOT use this appliance near water.
- x DO NOT immerse this appliance or any of its components (e.g., cord, plug, etc.) in water.
- x DO NOT let the cord hang over the edge of a table or counter.
- x DO NOT work near the appliance with long hair, loose clothing, or dangling jewelry.

Preventing Oven Damage

- ✔ When servicing this appliance, do not tear insulation to get to components. Rather, find the edge of the insulation and remove the tape that holds it in place.
- ✔ Clean the oven daily (page 5).
- ✔ Clean the oven only with TurboChef approved cleaner.
- x DO NOT clean with a water jet.
- x DO NOT slam or mishandle the oven window.
- x DO NOT frequently open and close the window to check the cook status of the food.
- x DO NOT allow cleaning solution or water to remain in the cook cavity longer than necessary.

Reducing Fire Risk

If materials inside the oven ignite or if smoke is observed,

1. Keep the oven window closed.
2. Turn off the oven.
3. Disconnect the power cord or shut off power at the fuse/circuit breaker panel.

- ✔ Carefully attend the oven if paper, plastic, or other combustible materials are placed inside the oven to facilitate cooking.
- x DO NOT leave items in the cook cavity when the oven is not in use.
- x DO NOT cook items wrapped in cling wrap or plastic film.
- x DO NOT overcook food.
- x DO NOT store (or use) gasoline or any other flammable vapors or liquids near this appliance.

If a gas leak is noticed,

- x DO NOT attempt to light or operate any appliance.
- x DO NOT operate any electronic device.
- ✔ Immediately use an exterior phone to contact your gas supplier.
- ✔ If you cannot contact your gas supplier, contact your local fire department.

Grounding Instructions

⚠ WARNING: Improper grounding increases the risk of electric shock.

This appliance must be grounded. The cord is equipped with a grounding wire and plug, which in the event of an electrical short circuit, reduce the risk of electric shock by providing an escape wire for the electric current. The wire must be plugged into an outlet that is properly installed and grounded.

Consult a qualified electrician or serviceman to determine whether or not the appliance is properly grounded.

- x DO NOT use an extension cord. If the power supply cord is too short, request a qualified electrician or serviceman to install an outlet near the appliance.

Power Cord Replacement

To avoid potential hazards, only the manufacturer, its service agent, or a similarly-qualified person should replace a damaged power cord.

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Specifications and Startup

Overview

Figures 1 and 2. For part numbers, see the appendix.

1. Air filter, 11.75” x 7.5” (298 mm x 190 mm)
2. Idle button (page 21)
3. Left end bell (page A-12)
4. Right end bell (page A-8)
5. VFD display and keypad (page 21 and A-8)
6. Chain guard
7. Conveyor belt
8. Window (optional feature)
9. Hi-limit reset switch
10. Burner compartment cover
11. Cooling fan tube
12. Air filter, 9” x 3.25” (228 mm x 83 mm)
13. Cooling fan tube access thumb screw
14. Burner compartment cover access screws
15. Power cord and plug (page ii)
16. Rating plate

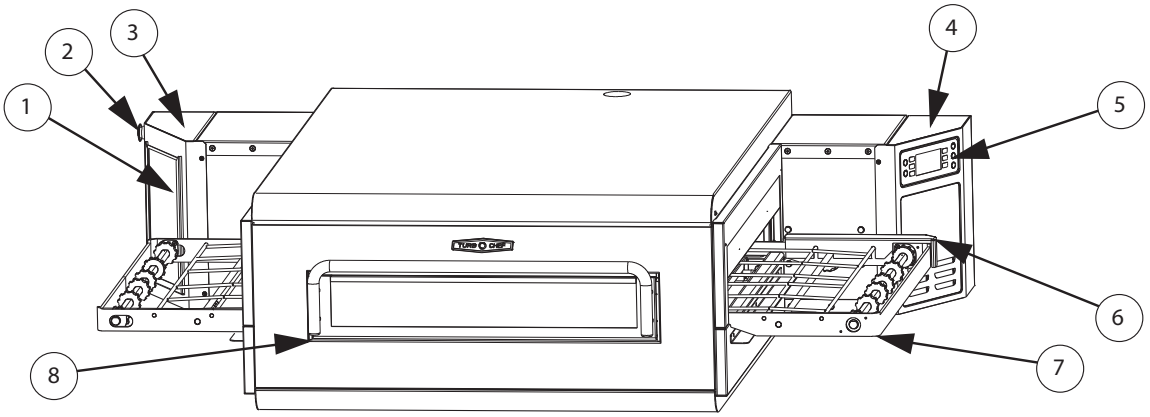


Figure 1: Oven Overview, Front

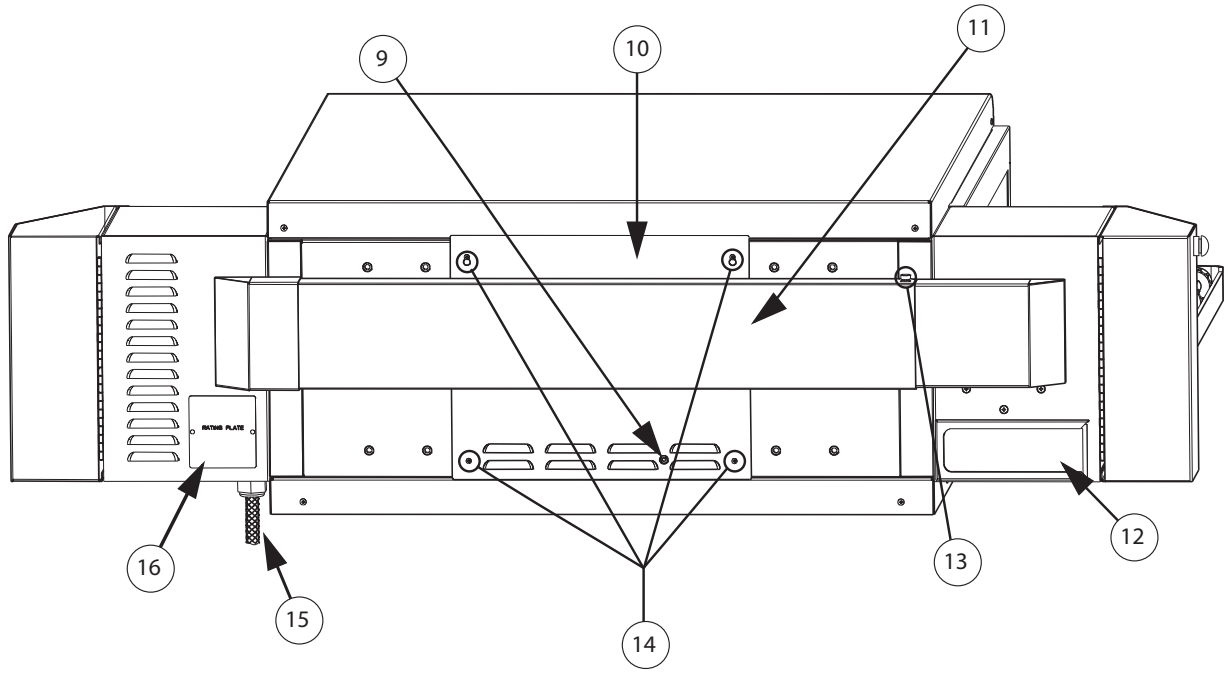


Figure 2: Oven Overview, Rear

Certifications

cULus GAS FIRED LISTED, UL EPH, FCC

Dimensions

With End Bells Closed

- Width: 72.13” (1832 mm)
- Depth: w/ window: 55.25” (1403 mm)
- Depth: w/o window: 52.85” (1342 mm)
- Height: 19.00” (483 mm)

With End Bells Open

- Width: 87.53” (2223 mm)
- Depth: w/ window: 59.20” (1504 mm)
- Depth: w/o window: 56.80” (1443 mm)
- Height: 19.00” (483 mm)

Oven Construction

- 430 stainless steel exterior
- 304 stainless steel interior
- Powder coated steel legs

Theory of Operation

The HhC3240 conveyor oven uses two independently-controlled blower motors to precisely distribute impinged air into the cook cavity from the top and bottom, creating a highly-customizable cooking environment and more throughput than any other oven its size.

Power Specifications

Electrical

	North America	EU / Asia
Phase	1 Phase	1 Phase
Voltage	208/240 VAC	220-240 VAC
Frequency	50/60 Hz	50/60 Hz
Current Draw	8 Amp	8 Amp
Supply	3 Wire (L+L+G)	3 Wire (L+L+G)
Breakers	20 amp	16 amp
Plug	NEMA L620	IEC, 309 3 PIN

Gas

-Volume: Maximum input per cavity
85k BTU (25kW [Gross])

-Min. Pressure (Nat, LP, I_{2H}, I_{2E}, I_{2E+}, I_{2L}, and I_{3P}):
6” W.C. (152.4 mm H_2O / 14.94 mb)

-Max. Pressure (Nat, LP, I_{2H}, I_{2E}, I_{2E+}, I_{2L}, and I_{3P}):
14” W.C. (350.6 mm H_2O / 34.87 mb)

-Burner Pressure (Nat, LP, I_{2H}, I_{2E}, I_{2E+}, and I_{3P}):
3.5” W.C. (88.9 mm H_2O / 8.71 mb)

-Burner Pressure (I_{2L}):
4.0” W.C. (101.6 mm H_2O / 9.96 mb)

Ventilation Requirements

The TurboChef model HhC3240 conveyor oven must be operated underneath a Type I or II hood. Always adhere to local building and gas codes. Local code is the prevailing authority for determining hood size and CFM.

Gas Derating

Contact TurboChef with questions regarding elevations and necessary adjustments.

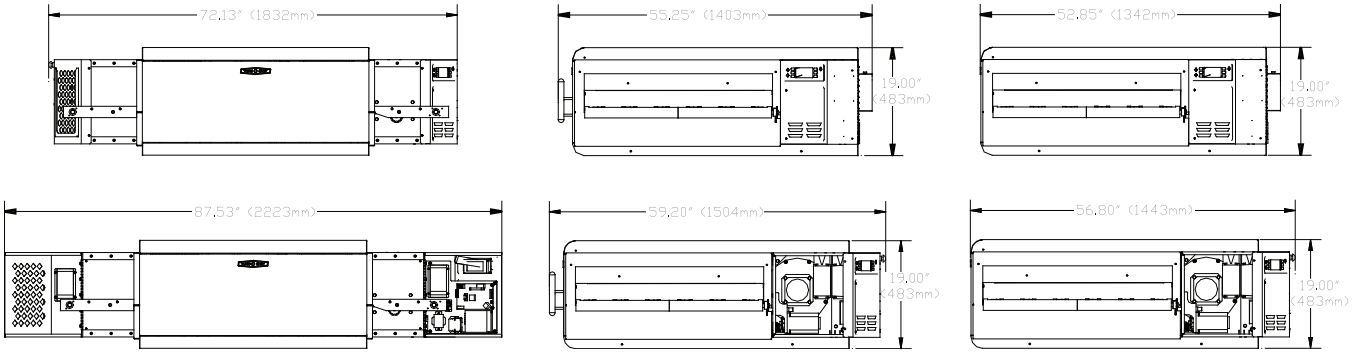


Figure 3: Dimensions

Gas Setup

A digital manometer that will read 0.10" WC (2.54 mmH_2O, 0.249 mb) must be used to properly set all pressures. If the minimum pressure is not set correctly, the oven temperature will slowly rise in stand-by mode and eventually cause cooking issues as well as trip the high limit temperature switch. Digital manometers (HHC-3001) are available through TurboChef; call 800.90TURBO (+1 214-379-6000) for pricing and availability. For information on accessing the burner control, see page 18.

Reading the Incoming Gas Pressure (Static)

1. Ensure the oven and all the equipment in the piping system are off (pilot lights are acceptable).
2. Remove the burner compartment cover and cooling fan tube (refer to page 1).
3. Remove the screw from the upper tap of the gas valve.
4. Attach the digital manometer to the upper tap of the gas valve (Figure 4). This tap will show the incoming pressure before the internal regulator of the gas valve.
5. The pressures must be no less than 6" W.C. (152.4 mmH_2O, 14.94 mb) and no more than 14" W.C. (350.6 mmH_2O, 34.87 mb). Otherwise, severe damage to the equipment can occur.
6. Reattach the screw to the upper tap of the gas valve.

Reading the Gas Pressure at 100% Flame

1. Ensure the oven is on.
2. Select a cooking profile.
3. Remove the screw from the lower tap of the gas valve.
4. During warmup (both fan speeds are at 65% and the oven is at 100% flame), attach the manometer to the lower tap of the gas valve (Figure 4).
5. Verify that the maximum operating pressure is 3.5" W.C. (88.9 mmH_2O, 8.71 mb), unless operating I_{2L} gas.

NOTE: I_{2L} gas requires a pressure of 4" W.C. (101.6 mmH_2O, 9.96 mb).

6. If not, use an 8mm nut driver to adjust the 8mm nut (Figure 4) until the manometer reads 3.5" W.C. (88.9 mmH_2O, 8.71 mb), unless operating I_{2L} gas, as noted above (turn clockwise to increase the pressure, counter-clockwise to decrease the pressure).
7. Reattach the screw to the lower tap of the gas valve.

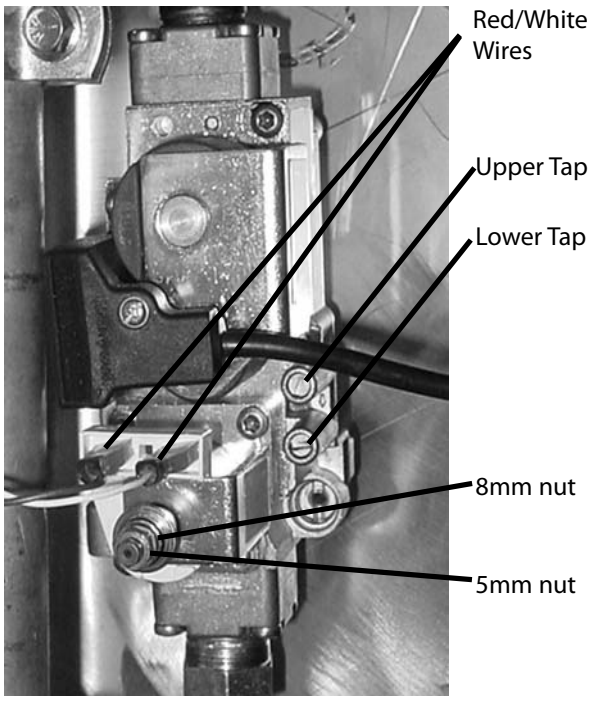


Figure 4: Gas Valve

Reading the Gas Pressure at Minimum Flame

1. Remove either the red or white wire (Figure 4).
2. Attach the electric manometer to the lower tap of the gas valve (Figure 4).
3. Verify that the minimum operating pressure is 0.10" W.C. (2.54 mmH_2O, 0.249 mb).
4. If not, use a 5mm nut driver to adjust the 5mm nut until the electric manometer reads 0.10" W.C. (2.54 mmH_2O, 0.249 mb) (turn clockwise to increase the pressure, counter-clockwise to decrease the pressure).
5. Reconnect the wire you removed.
6. If adjustments were made, re-check 100% flame pressure (see adjacent procedure).

Reading the Operating Gas Pressure

1. Ensure the oven is on.
2. Select a cooking profile (page 10).
3. Remove the screw from the upper tap of the gas valve.
4. During warmup (both fan speeds are at 65% and the oven is at 100% flame), attach the manometer to the upper tap of the gas valve (Figure 4).
5. Ensure that the pressure is no less than 6" W.C. (152.4 mmH_2O, 14.94 mb)and no more than 14" W.C. (350.6 mmH_2O, 34.87 mb).
6. Reattach the screw to the upper tap of the gas valve.

Confirming Proper Closure of all Taps

Additional testing may be required - always adhere to local gas codes and required methods of leakage testing in the immediate location (refer to the regulations in force in the country in which the appliance is being installed). The prevailing authority is the local code (or regulations).

1. Turn on the gas supply.
2. Spray all gas connections with a soap solution.

   -If growing soap bubbles are observed, a leak is present. Immediately shut off the gas supply.

   -If no growth occurs, the connections are intact. Turn off the gas supply.

Cleaning

Cleaning the Oven

Follow the steps below daily to help maintain your HhC oven.

Supplies and Equipment

TurboChef-approved oven cleaner, nylon scrub pad, cleaning towels, disposable gloves

Daily Cleaning Procedures

Step 1

Step 1: Prepare the Oven

-Press the back/off key (page 9) to turn the oven off.

-Ensure cooling down has completed.

⚠ CAUTION: Injury can occur if oven is not allowed to cool properly before cleaning. DO NOT attempt to clean until the "cooling down" message has disappeared.

Step 2

Step 2: Remove and Clean the End Trays

-Remove both end trays.

-Wash and rinse both end trays, then dry them with a clean towel.

-Reinstall the end trays.

Step 3

Step 3: Remove and Clean the Crumb Trays

-Slide out and remove both crumb trays.

-Wash and rinse both crumb trays, then dry them with a clean towel.

-Reinstall the crumb trays.

Step 4

Step 4: Remove and Clean the Filters

-Remove the filters, both of which are located on the left side of the oven.

-Wash and rinse both filters, then dry them with a clean towel.

+ If a filter is torn or damaged, replace with a new filter (page A-2 for part number).

⚠ CAUTION: DO NOT operate the oven without the filters in place.

Step 5

Step 5: Clean the Oven Exterior

-Wipe the oven exterior and window with a clean, damp towel.

-The oven is ready to turn on.

Deep Cleaning Procedures

TurboChef recommends deep cleaning the oven once a month (or more frequently depending on use) to ensure optimal performance. Use only TurboChef-approved cleaner. Using any other cleaning product can damage critical parts and may void the oven's warranty.

Step 1

Step 1: Prepare the Oven

-Press the back/off key (page 9) to turn the oven off.

-Ensure cooling down has completed.

⚠ CAUTION: Injury can occur if oven is not allowed to cool properly before cleaning. DO NOT attempt to clean until the "cooling down" message has disappeared.

Step 2

Step 2: Remove and Clean the End Trays

-Remove both end trays.

-Wash and rinse the end trays, then dry them with a clean towel.

Step 3

Step 3: Remove and Clean the Crumb Trays

-Slide out and remove both crumb trays.

-Wash and rinse both crumb trays, then dry them with a clean towel.

Step 4

Step 4: Remove and Clean the Filters

-Remove the filters, both of which are located on the left side of the oven.

-Wash and rinse both filters, then dry them with a clean towel.

+ If a filter is torn or damaged, replace with a new filter (page A-2 for part number).

⚠ CAUTION: DO NOT operate the oven without the filters in place.

Step 5

Step 5: Remove and Clean the Chain Guard

-Remove the guard that covers the conveyor drive chain.

-Wash and rinse the chain guard, then dry it with a clean towel.

Step 6

Step 6: Remove and Clean the Upper End Panels

-Remove both upper end panels from each end of the oven.

-Wash and rinse the upper end panels, then dry them with a clean towel.

⚠ WARNING: Lock all four casters before removing the conveyor, lower plenum assembly, and upper nozzle plate. Physical injury or damage to equipment can occur if the casters are not locked.

Step 7

Step 7: Remove and Clean the Conveyor (requires TWO people)

-Position one person at each end of the conveyor.
-Lift the conveyor assembly up and then towards the left side of the oven until the conveyor drive chain has enough slack for removal.
-Remove the conveyor drive chain.

⚠ WARNING: Never attempt to remove the conveyor with fewer than 2 people.

-Lift the conveyor and push it through the right side of the oven for removal.
-Wash, rinse, and dry the conveyor with a clean towel.

Step 8

Step 8: Remove and Clean the Lower End Panels

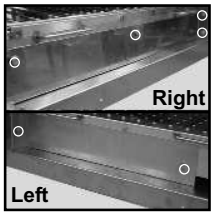
-Remove both lower end panels from each end of the oven.
-Wash and rinse the lower end panels, then dry them with a clean towel.

Step 9

Step 9: Remove and Clean the Upper Nozzle Plate

-Remove the thumbscrew holding the upper nozzle plate in place on the right side of the oven (located between the two handles). If the right side upper air diverter is incorrectly positioned in front of the lip of the upper nozzle plate, remove the right side upper air diverter.
-Spray the upper nozzle plate with TurboChef Oven Cleaner to break apart any heavy stains. Allow cleaner to penetrate stains for five minutes.
-Scrub the upper nozzle plate with a nylon scrub pad.
-Rinse the upper nozzle plate with water and wipe it with a clean, damp towel.

⚠ WARNING: Be sure to THOROUGHLY remove all cleaner residue.



Step 10

Step 10: Remove and Clean the Right and Left Lower Air Diverters

-Remove the four thumbscrews from the right side lower air diverter.
-Remove the right side lower air diverter.
-Remove the two thumbscrews from the left side lower air diverter.
-Remove the left side lower air diverter.
-Wash and rinse the lower air diverters, then dry them with a clean towel.

Step 11

Step 11: Remove and Clean the Lower Plenum Assembly

-Remove the lower plenum assembly from the right side of the oven.
-Spray the lower plenum assembly with TurboChef Oven Cleaner to break apart any heavy stains. Allow cleaner to penetrate stains for five minutes.
-Scrub the lower plenum assembly with a nylon scrub pad.
-Rinse the lower plenum assembly with water and wipe it with a clean, damp towel.

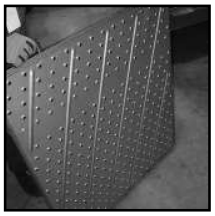
⚠ WARNING: Be sure to THOROUGHLY remove all cleaner residue.

Step 12

Step 12: Clean the Oven Interior

-Spray the bottom and sides of the oven interior with TurboChef Oven Cleaner to break apart any heavy stains. Allow cleaner to penetrate stains for five minutes.
-Scrub the oven interior with a nylon scrub pad.
-Wipe the oven interior with a clean, damp towel.

⚠ WARNING: Be sure to THOROUGHLY remove all cleaner residue.


Step 13

Step 13: Reinstall the Oven Components

-Reinstall the lower plenum assembly (if upper nozzle plate was cleaned, reinstall now).
-Reinstall the lower end panels.
-Reinstall the conveyor and chain.
-Reinstall the upper end panels.
-Reinstall the chain guard, filters, and crumb trays.

Step 14

Step 14: Clean the Oven Exterior

-Wipe the oven exterior and window with a clean, damp towel.
-The oven is ready to turn on.

Standard Oven Operation

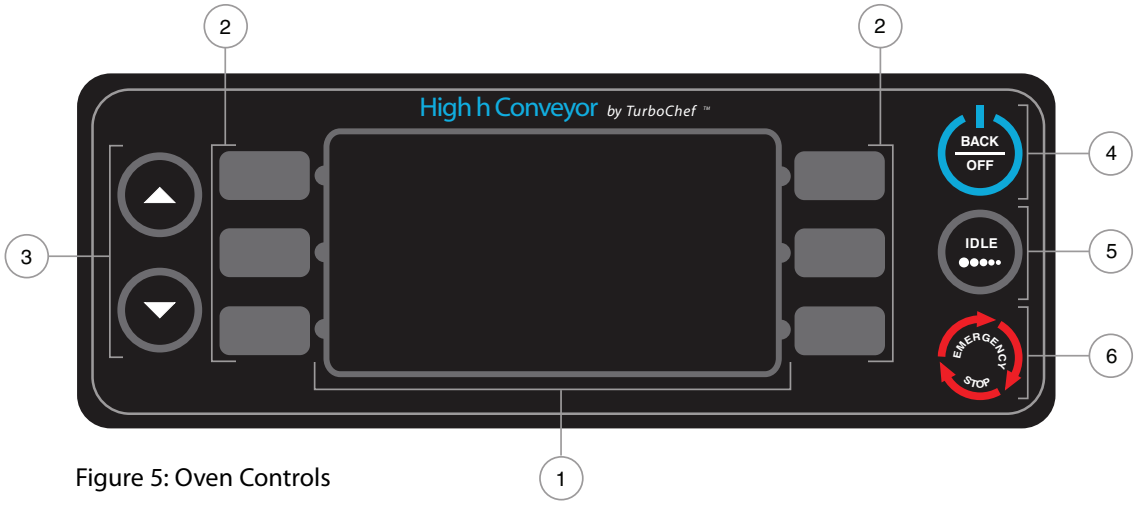


Figure 5: Oven Controls

Oven Controls

Figure 5

1. Display

The display shows current oven operation and/or user programming information.

2. Soft Keys

Six soft keys are on the oven controls, three on the left (L1, L2, L3, where L1 = top) and three on the right (R1, R2, R3, where R1 = top). Press a soft key to select the option/command that is adjacent to it on the screen.

3. Up and Down Keys

When the oven is in the OVEN OFF MODE, use the up key to access the CONFIG MODE (page 15). Use the down key to access cooking profiles 5-8.

When the oven is in TEST MODE (page 17), press the down key to access the second screen of options. Press the up key to go back to the first page.

Press the up and down keys to also change option settings, where applicable

4. Back/Off Key

Depending on the mode the oven is in, the back/off key will return the oven to the previous screen or turn the oven off.

5. Idle Key

The idle key activates the IDLE MODE (page 12).

6. Emergency Stop Key

The emergency stop key shuts down the conveyor and burner, at which time the display shows the belts halted screen. From the belts halted screen, press the back/off key to turn the conveyor back on and send the oven to the COOLING DOWN MODE (page 11).

DO NOT use the emergency stop key as a general on/off switch.

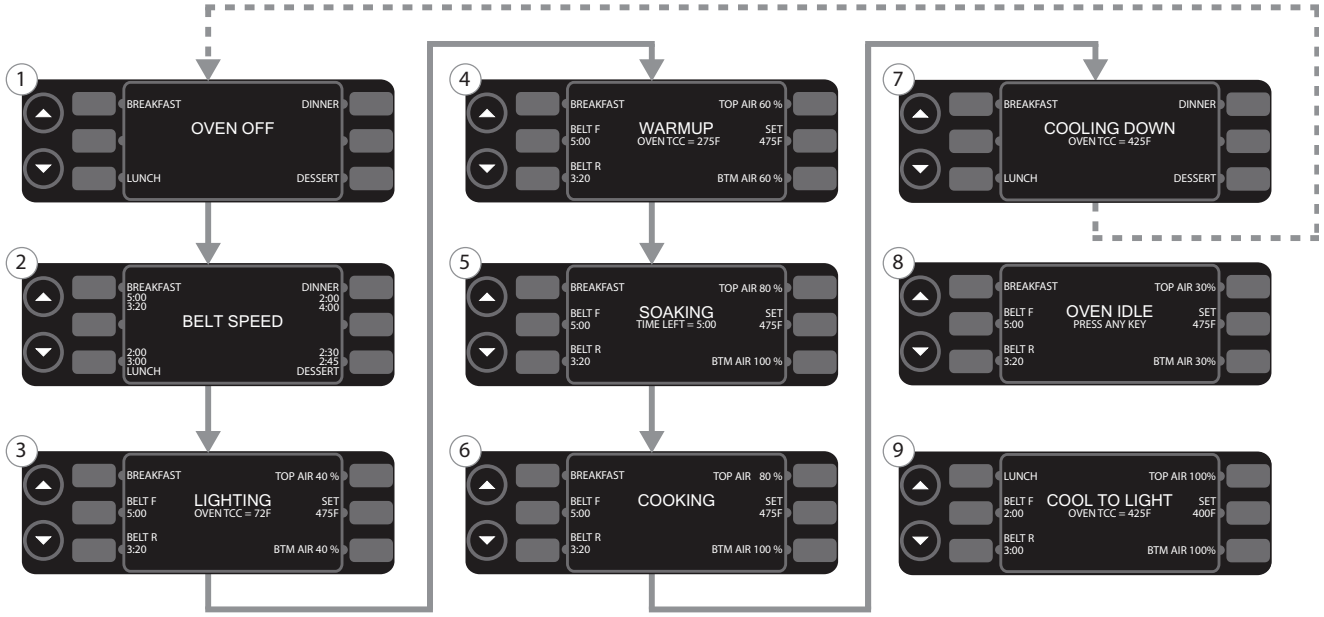


Figure 6: Cooking Modes

Cooking a Product

This section explains how to cook a food product by describing the "standard operation" modes through which the oven progresses (Figure 6).

-MODE 1: Oven Off
-MODE 2: Belt Speed Select
-MODE 3: Lighting
-MODE 4: Warming
-MODE 5: Soaking
-MODE 6: Cooking
-MODE 7: Cooling Down
-MODE 8: Idle
-MODE 9: Cool To Light

NOTE: MODES 8 and 9 are not part of a "standard" cooking cycle. They only occur when the user intervenes as described on page 12.

Mode 1: Oven Off

Mode during which all cooking components are off and the oven temperature has receded below 150°F (66°C), but the display and keypad remain on. The user can access cooking profiles 1-4 on this screen (1) or press the down key to access cooking profiles 5-8.

Happens When...
-Power is supplied to the oven.
-The oven completes MODE 7.
-The user presses the down key while-accessing
-The CONFIG MODE (refer to page 15 for more information).

Goes To...
-MODE 2 when the user selects a cooking profile (soft keys L1, L3, R1, or R3).
-CONFIG MODE when the user presses the up key.

Mode 2: Belt Speed Select

Mode during which the user selects the desired belt speed.

NOTE: If a different key is pressed, the oven will ask if you wish to continue or return to the belt speed select screen. If you select continue, the oven will not save the belt speed.

Happens When...
-The user selects a cooking profile from MODE 1 or 7.

Goes To...
-MODE 3 when the user selects a belt speed and the set cooking temperature is higher than the oven's current temperature.

-MODE 9 when the user selects a belt speed and the set cooking temperature is lower than the oven's current temperature.

Mode 3: Lighting

Mode during which the ignition module applies voltage to the spark rod to start the burner.

Happens When...
-The user selects a belt speed from MODE 2.

Goes To...
-MODE 4 when the control board receives a signal from the flame sensor that a flame is present.
-MODE 6 if the oven's current temperature is within 25°F (14°C) of the oven's set temperature.

Mode 4: Warming

Mode during which the oven warms to the pre-set cooking temperature defined by the cooking profile that was selected.

Happens When...
-MODE 3 successfully completes, and the oven's temperature at the beginning of warmup was not within (less than) 25°F (14°C) of the oven's set temperature.

Goes To...
-MODE 5 once the oven has reached the temperature defined by the selected cooking profile.
-MODE 7 when the user presses the back/off key and the oven is above 150°F (66°C).

Mode 5: Soaking

Mode during which the oven has completed warming up and automatically allows an additional five minutes for the oven cavity surfaces to warm.

Happens When...
-MODE 4 completes (within 5°F [3°C] of set point)

Goes To...
-MODE 6 when soaking completes.
-MODE 7 when the user presses the back/off key and the oven is above 150°F (66°C).

Mode 6: Cooking

Mode during which the oven is ready to cook. The user can place food on the conveyor to cook, or edit cook settings if the full edit or flex option is enabled. See page 12 for more information on full edit and flex options.

Happens When...
-MODE 5 completes.
-MODE 3 completes, if the oven's current temperature is within 25°F (14°C) of the oven's set temperature.
-The user presses the idle key, up key, down key, or any soft key during MODE 8.

Goes To...
-MODE 7 when the user presses the back/off key.
-MODE 8 when the user presses the idle key.
-MODE 4 if the temperature drops 25°F (14°C) or more below the set point.
-MODE 9 if temperature rises 25°F (14°C) or more above the set point.

Mode 7: Cooling Down

Mode during which the burner assembly shuts off to allow the oven to cool.

Happens When...
-The user presses the back/off key from MODES 3 or 4 (and the oven temperature is above 150°F [66°C]), or from MODES 5, 6, 8, or 9.

Goes To...
-MODE 1 when the oven temperature has receded below 150°F (66°C).
-MODE 2 when the user selects a cooking profile.

Mode 8: Idle

Mode during which both blowers are reduced to 30% to save power. All other oven components remain the same.

Happens When...
-The user presses the idle key from MODE 6.

Goes To...
-MODE 6 when the user presses the idle key, up key, down key, or any soft key.
-MODE 7 when the user presses the back/off key.

Mode 9: Cool to Light

Mode during which the burner assembly shuts off to allow the oven to cool to the set cooking temperature defined by the profile that was selected.

Happens When...
-The user selects a cooking profile from MODE 1 or 7 that has a set cooking temperature lower than the oven's current temperature.

Goes To...
-MODE 3 when the oven has cooled to the set temperature of the current cooking profile.
-MODE 7 when the user presses the back/off key.

Editing a Cooking Profile

To edit a cooking profile, the oven must be in the COOKING MODE and the full edit or flex option must be enabled. For more information on selecting between full edit, rigid, and flex options, see *Edit Options Screen* on page 16.

When the rigid option is enabled, the soft keys displayed in Figure 7 are disabled and no menu editing is allowed.

When the full edit option is enabled, a cooking profile is fully customizable and all changes are saved once the oven returns to the OVEN OFF or COOLING DOWN MODE.

When the flex option is enabled, a cooking profile is customizable within flex option limitations (as described in the following sections), and all changes will reset when the oven returns to the OVEN OFF or COOLING DOWN MODE.

This section assumes that the full edit option is enabled (except where otherwise noted) and that a cooking profile has been enabled.

Changing a Cooking Profile's Name

The full edit option must be enabled to change a cooking profile's name.

1. From the cooking screen (Figure 7), press L1 to access the name change screen (Figure 8).

2. Change the name of the cooking profile.
   - The up key moves up through the available characters. e.g. A,B,C…
   - The down key moves down through the available characters e.g. A,+,-, ,9,8,…
   - INS (L1) inserts a space.
   - DEL (R1) deletes the selected character.

Figure 7: Cooking Screen

Figure 8: Name Change Screen

- ---> (R1) moves the cursor to the right. The cursor starts at the far left character. If ---> is pressed when the cursor is on the far right character, the cursor moves to the far left character.

- <--- (L1) moves the cursor to the left. The cursor starts at the far left character. If <--- is pressed when the cursor is on the far left character, the cursor moves to the far right character.

3. Press save (R3) to save the changes or cancel (L3) to cancel any changes.

Adjusting the Belt Speed

Figure 7

The High h Conveyor Oven can accommodate either one or two conveyor belts. The oven will automatically detect the number of conveyor belts installed and display the option to change the speed of each conveyor belt independently.

1. Press the soft key adjacent to the conveyor belt you wish to adjust (press L2 for the front belt [Belt F] or L3 for the rear belt [Belt R]).

2. Adjust the time it takes for the conveyor belt to completely cycle through the oven.

   - The up key increases bake time in 5-second increments.
     + Flex option enabled: the user can only increase the time up to an additional 15 seconds.

   - The down key decreases bake time in 5-second increments.
     +Flex option enabled: the user cannot decrease the time by more than 15 seconds.

3. Press the soft key adjacent to the belt that was adjusted to exit the belt speed controls.

Adjusting the Temperature

Figure 7

1. Press R2 to access the temperature controls.

2. Adjust the temperature.

   - Press the up key to increase the temperature in 5°F/5°C increments.
     +Flex option enabled: the user can only increase the temperature up to an additional 10°F/5°C.

   - Press the down key to decrease the temperature in 5°F/°5C increments.
     +Flex option enabled: the user cannot decrease the temperature by more than 10°F/5°C.

3. Press R2 again to exit the temperature controls.

Adjusting the Top and Bottom Air

Figure 7

1. Press R1 to access the top air controls, or R3 to access the bottom air controls.

2. Adjust the air speed.

   - Press the up key to increase the air speed in 5% increments up to 100%.
     +Flex option enabled: the user can only increase the air speed by up to an additional 15%.

   - Press the down key to decrease the air speed in 5% increments down to 30%.
     +Flex option enabled: the user cannot decrease the air speed by more than 15%.

   - Press the soft key again to exit the air controls.

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Oven Modes

The Config Mode

The CONFIG MODE (Figure 9) serves four main purposes:

1. To access the smart card screen.
2. To access the fault count screen.
3. To access the SETUP MODE.
4. To access the TEST MODE.

To access the CONFIG MODE, press the up key from the OVEN OFF MODE.

Smart Card Screen

The smart card screen allows the user to
-Load a menu from smart card to oven.
-Save a menu from oven to smart card.

To load or save a menu,

1. Press L3 (Figure 9) to access the smart card screen (Figure 10).
2. Insert a smart card into the smart card slot (Figures 11 and 12), with the gold chip facing the inside of the oven.
3. Load or save a menu.
   - Press R1 to load a menu from the smart card to the oven (Figure 10).
   - Press R2 to save a menu from the oven to the smart card (Figure 10).

Updating the Firmware

From the oven off screen,

1. Insert the gray smart card (see Figure 11) with the gold chip facing the inside of the oven. If multiple smart cards are required, they will be labeled in sequence - ensure the correct sequence is followed.
2. From the COOLING DOWN or OVEN OFF MODE, press and hold the idle key until the oven resets (approximately 5 seconds). The display will go blank until the upload is complete.
3. When the oven beeps one long high tone, the load was successful. If a second card was provided, insert it.
4. When the oven restarts and the display turns on, the update is complete. Remove the smart card.

NOTE: If the update is unsuccessful, the display will remain off and the oven will beep one long, low tone. If this occurs, repeat the above procedure. If the update fails multiple times, a smart card may be damaged. Contact TurboChef to obtain a new smart card.

Figure 9: Config Mode

Figure 10: Smart Card Screen

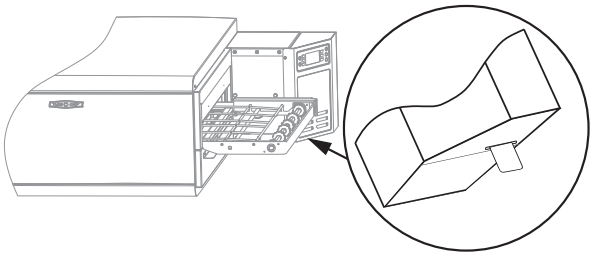


Figure 11 Smart Card slot location

Figure 12: Insert Smart Card Screen

Accessing the Fault Count Screen

Refer to page 29 for fault descriptions.

From the CONFIG MODE (Figure 9, page 15), press R1 to access the fault count screen (Figure 13). The oven will display the number of faults that have occurred since the oven fault counts were last cleared (page 20), the oven's software was last updated (page 15), or the oven was last returned to the manufacturer's default settings (page 20).

Accessing the Setup Mode

From the CONFIG MODE (Figure 9, page 15), press L1 to access the SETUP MODE. The SETUP MODE allows the user to customize several oven settings - see below for more details.

Accessing the Test Mode

From the CONFIG MODE (Figure 9, page 15), press R3 to access the TEST MODE. The TEST MODE gives the service agent the ability to diagnose oven problems and perform other service related tasks. See page 17 for more information on the TEST MODE.

Setup Mode

Figure 14

The SETUP MODE serves four main purposes:

1. To change the display temperature.
2. To access the edit option screen.
3. To change the display language.
4. To access the info screen.

To access the SETUP MODE, press the up key from the OVEN OFF or COOLING DOWN MODE (to access the CONFIG MODE), and then press L1.

Changing the Display Temperature

The oven can display the temperature in either Celsius or Fahrenheit units. To change the display temperature, press L1 in SETUP MODE (Figure 14).

Edit Option Screen

The edit option screen (Figure 16) allows the user to switch between full edit, rigid, and flex options. For more information on the different edit options, see *Editing a Cooking Profile* on page 12.

To access the edit option screen,

1. Press L3 (Figure 14) to access the password screen (Figure 15).
2. Input the password 6 6 3 3 by pressing the soft key adjacent to the appropriate number.

To change the edit option (Figure 16),
-Press L1 to select the full edit option.
-Press L2 to select the rigid option.
-Press L3 to select the flex option.

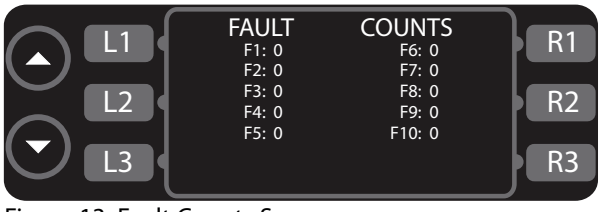


Figure 13: Fault Counts Screen

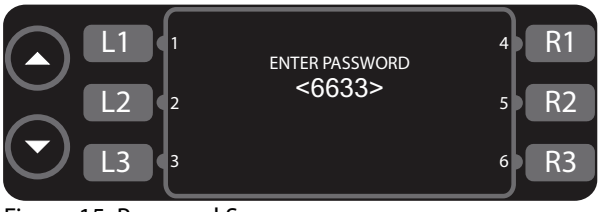


Figure 15: Password Screen

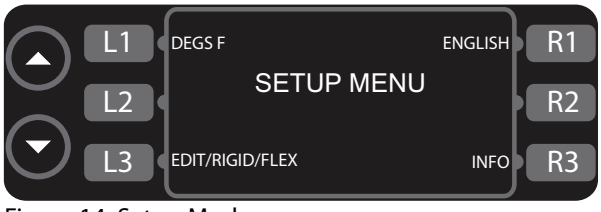


Figure 14: Setup Mode

Figure 16: Edit Option Screen

Changing the Display Language

NOTE: This feature is not available on all oven models.

From the setup menu screen, press R1 to change the language (Figure 14):

-English
-French
-German
-Spanish

Info Screen

The info screen (Figure 17) is used to display the following information in an easy to access place:

- The oven's serial number
- The oven's electrical compartment temperature
- The oven's voltage
- The total time the oven has been on
- The total time the oven has been idle
- The oven's software version

To access the info screen, press R3 within the SETUP MODE.

Test Mode

Figures 18-19

The TEST MODE serves six main purposes:

1. To test individual oven components.
2. To view oven information.
3. To reset oven parameters.
4. To input a new serial number.
5. To perform a burn-in test.

NOTE: When the oven is in TEST MODE, the burner does not operate unless a burn-in test is being performed.

To access the TEST MODE,

1. Press the up key from the OVEN OFF or COOLING DOWN MODE to access the CONFIG MODE.
2. Press the R3 soft key.
3. Input the password 2 4 3 3 (Figure 20).

The TEST MODE consists of two screens (Figures 18 and 19). Use the up and down keys to navigate between them.

From screen 1 of the TEST MODE, the user can:

-Access the burner control screen.
-Manipulate the top and bottom blowers.
-View the status indicators.

From screen 2 of the TEST MODE, the user can:

-Input a new serial number
-Initiate a burn-in test
-Erase all oven settings
-Enable/disable maintenance mode*
-Clear the fault counts

* The maintenance mode will show temperature, burner operation, and other diagnostics while the oven is running.

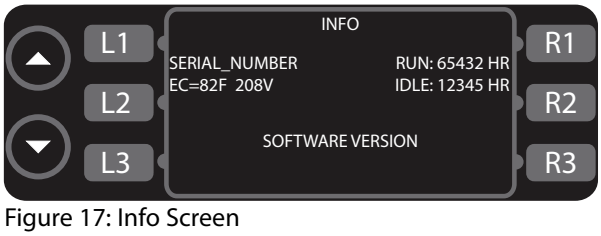


Figure 17: Info Screen

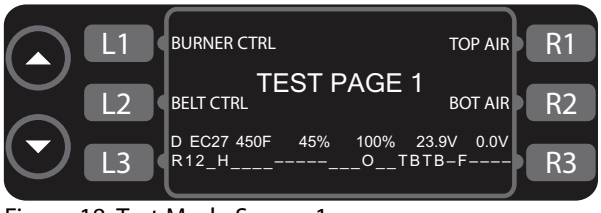


Figure 18: Test Mode Screen 1

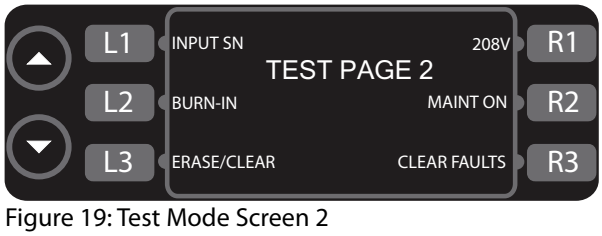


Figure 19: Test Mode Screen 2

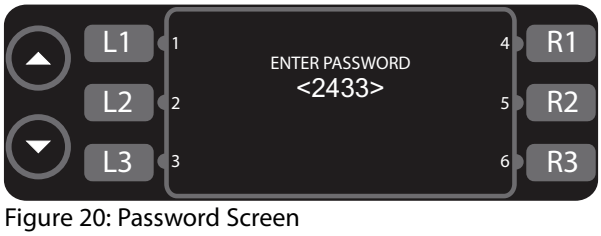


Figure 20: Password Screen

Accessing the Burner Control Screen

From screen 1 of the TEST MODE (Figure 18, page 17), press L1 to access the burner control screen (Figure 21).

Use this mode to set gas pressures (see page 3).

To change the burner's setting,

-Press L1 to set the burner to full (or to light the burner).

-Press L2 to set the burner to low.

-Press R1 to turn the burner off.

Accessing the Belt Control Screen

From TEST MODE screen 1 (Figure 18, page 17), press L2 to access the belt control screen (Figure 22). Use this mode to verify the belts work correctly. The number after the belt speed shows the pulses read by the HES. The percentage is the amount of drive being asked of the CMSC (100% = 10V).

To change the belt's setting,

-Press L1 to turn the belts off.

-Press L2 to access the belt F controls.

-Press L3 to access the belt R controls.

Manipulating the Top and Bottom Blowers

Figure 18, page 17.

The user can change the speed of the top and bottom blowers independently. To change the speed of the blowers,

1. From screen 1 of the TEST MODE, press R1 to access the top blower or R2 to access the bottom blower.
2. Press the up or down keys to change the speed of the selected blower in 5% increments. The percentage of air cannot go below 30% or above 100%.

Viewing the Status Indicators

Figure 21

The status indicators are located at the bottom of TEST MODE screen 1 and the burner control screen. The status indicators are split into two display lines.

Top Display Line

The top display line shows values relating to oven components. The letters a-g below and on Figure 23 indicate the different top display line status indicators, which are explained below.

a Shows which key is currently pressed.
-U = up key
-D = down key
-a = L1
-b = L2
-c = L3
-f = R1
-g = R2
-h = R3
-P = back/off key
-I = idle key
-S = emergency stop key

b Shows the temperature within the electrical compartment (temperature displayed in Celsius only).

c Shows the temperature within the cook chamber.

d Shows the % value to which the gas valve is set.

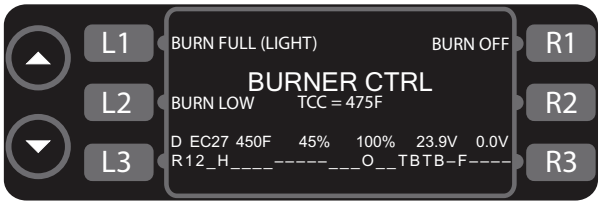


Figure 21: Burner Control Screen

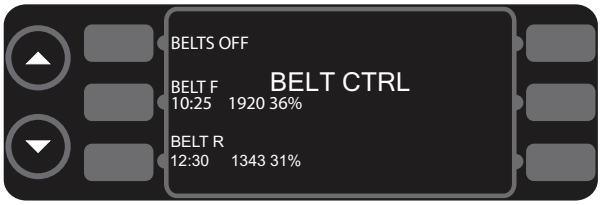


Figure 22: Belt Control Screen

e Shows whether or not the igniter is on. 0% = OFF, 100% = ON.

f Shows the voltage of the power supply.

Bottom Display Line

The bottom display line shows enabled inputs and outputs on the control board. The numbers 1-10 indicate the different bottom display line, which are explained below.

NOTE: A "-" or "_" displayed on the bottom display line denotes values that are not applicable to this oven.

1 "R" represents the real time clock pulse used by the control board to time oven functions. The "R" will blink once per second.

2 The "1" shows that the rear belt's conveyor motor's Hall Effect Sensor (HES) is sending a pulse to the control board.

3 The "2" shows that the front belt's conveyor motor's HES is sending a pulse to the control board.

4 The "H" will only be missing during an F3: Flameout fault.

5 The "O" will only be missing during an F8: High Limit Tripped fault.

6 The first "T" is displayed while the top air BMSC reports an ok status to the control board.

7 The first "B" is displayed while the bottom air BMSC reports an ok status to the control board.

8 The second "T" is displayed while the top air BMSC is enabled and receiving a command.

9 The second "B" is displayed while the bottom air BMSC is enabled and receiving a command.

Entering a New Serial Number

Figure 24

1. Press L1 (Figure 19, page 17) on screen 2 of the TEST MODE to access the input new serial number screen.

2. Enter the new serial number.

   -The up key moves up through the available characters. i.e. A,B,C…

   -The down key moves down through the available characters i.e. A,+,-, ,9,8,…

   - INS (L1) inserts a space.

   - DEL (R1) deletes the selected character.

   - ---> (R2) moves the cursor to the right. The cursor starts at the far left character. If ---> is pressed when the cursor is on the far right character, the cursor moves to the far left character.

   - <--- (L2) moves the cursor to the left. The cursor starts at the far left character, if <--- is pressed when the cursor is on the far left character, the cursor moves to the far right character.

3. Press save (R3) to save the changes or cancel (L3) to cancel any changes.

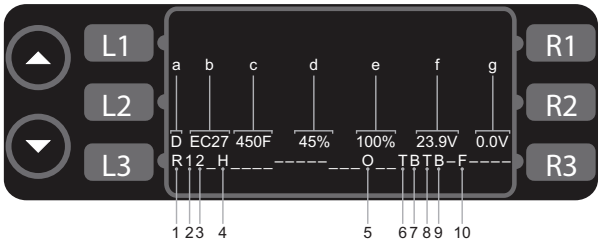


Figure 23: Status Indicator Explanation

Figure 24: Enter New Serial Number Screen

Initiating a Burn-In Test

NOTE: Burn-in tests are for manufacturing use only. DO NOT initiate a burn-in test unless expressly instructed by TurboChef.

To initiate a burn-in test, Press L2 (Figure 19, page 17) on screen 2 of the TEST MODE.

The burn-in test (Figure 25) runs the oven for 45 minutes to ensure correct oven operation. When the burn-in test completes, the burn-in complete screen (Figure 26) appears. Press any key to send the oven to the COOLING DOWN MODE. If the burn-in test fails, the applicable error code will appear and the oven will return to the COOLING DOWN or OVEN OFF MODE.

Erasing all Oven Settings

To erase all oven settings and return the oven to the manufacturer defaults, press L3 (Figure 19, page 17) on screen 2 of the TEST MODE. The oven will ask you to confirm this action (Figure 27); press R3 to confirm or the back/off key to cancel.

⚠ CAUTION: Settings cannot be retrieved once the erase option is confirmed.

Clearing the Fault Counts

To clear the fault counts (reset all fault counts to 0), press R3 (Figure 19, page 17) on screen 2 of the test mode. The oven will ask you to confirm this action (Figure 28), press R3 to confirm or the back/off key to cancel

⚠ CAUTION: Fault counts cannot be retrieved once the erase option is confirmed.

Viewing the Serial Number

The serial number is located at the bottom of screen 2 of the TEST MODE (Figure 19, page 17).

⚠ CAUTION: Write this number down before replacing the I/O control board. Replacing the I/O control board will erase this number from the oven's memory.

If replacing a control board, see page 19 for re-entering the serial number.

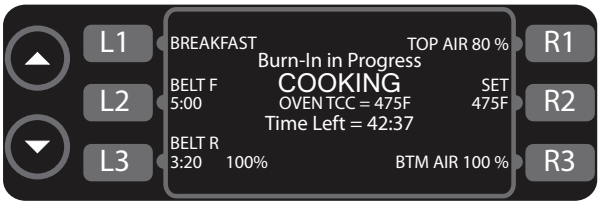


Figure 25: Burn-In Test Screen

Figure 26: Burn-In Passed Screen

Figure 27: Confirm Erase All Screen

Figure 28: Confirm Clear Fault Counts Screen

Oven Systems

The Control System

This section contains information about the following components:

-Control Board
-Display
-EMI Filter
-Fuses
-High-limit Thermostat
-Idle Button
-Keypad
-Power Supply - 24VDC (Domestic)
-Power Supply - 24VDC (International)
-Relay (K3 - Gas)
-Relay (K4 - Ignition)
-RTD
-Smart Card Reader
-Speaker
-Thermostat - 120°F (Close on Rise)
-Wire Harness

This section also contains testing procedures for the following components:

-Power Supply - 24VDC (Domestic)
-Power Supply - 24VDC (International)
-Relay (K3 - Gas)
-Relay (K4 - Ignition)
-RTD

Control Board

The control board is powered by the 24 VDC power supply, and sends control voltage to all the relays. See page 45 for a schematic. 24 VDC can be measured at the J9 connector, pins 19 and 8. See pages 45-47.

Display

The vacuum fluorescent display is the primary user interface, and is powered by the control board using 5 VDC. Its input voltage can be tested at J7, pins 1 and 3 (page 45).

EMI Filter

The EMI filter helps suppress the amount of RF "noise" emitted by the oven, also filtering noise from entering the controls.

Fuses

The control circuit is ultimately protected by two 20-amp class CC fuses, which are in the line-voltage circuit (incoming voltage). The fuses are designed to blow in case of an over-current situation.

High-Limit Thermostat

The high limit thermostat is a 3-pole, manual reset thermostat with a trip point of 572ºF (300ºC). The thermostat interrupts power to both the ignition module and the closed circuit of the I/O control board.

Idle Button

The Idle Button places the oven in idle mode, slowing the blowers to 30%. When lit, idle mode is active.

Keypad

The keypad is an 11-key membrane switch.

Power Supply - 24VDC (Domestic)

The power supply - 24VDC (domestic) converts line voltage (208-240 VAC) to 24 VDC. Line voltage (208-240 VAC) is connected to terminals 1 & 4 (jumper between terminals 2 & 3, terminal 5 is not used). The resistance from terminals 1 to 4 (with wires disconnected) is 20.7 Ω. The output (24 VDC) is on terminals "+OUT" (power = good) and "-OUT" (power = bad).

Testing Procedure

1. Disconnect line voltage from the unit.
2. Take a resistance reading on terminals 1 & 4.
   a) If terminal resistance is correct (20.7 Ω):
      -Apply line voltage to the unit.
      -Check for line voltage (208-240 VAC) at terminals 1 & 4.

b) If terminal resistance is incorrect, replace the power supply.

3. If correct voltage is present, disconnect the output wires and check output (-OUT & +OUT) for 24 VDC.
4. If voltage is present with output wires disconnected and not present when the wires are connected, inspect the wire harness for damage or shorts.
5. If the wire harness is intact and undamaged, the power supply is damaged or defective and must be replaced (page A-8).

Power Supply - 24VDC (International)

The power supply - 24VDC (international) converts line voltage to 24 VDC. Line voltage is connected to terminals L & N. The output (24 VDC) is on terminals "-V" and "+V".

Testing Procedure

1. Check for line voltage (208-240 VAC) at terminals L & N.
2. If correct voltage is present, check output (-V & +V) for 24 VDC (with output wires disconnected).
3. If voltage is present with output wires disconnected and not present when the wires are connected, inspect the wire harness for damage or shorts (page 45).
4. If wire harness is intact and undamaged, the power supply - 24VDC (international) is damaged or defective and must be replaced (page A-8).

K3 Relay - Gas

The K3 relay is a single pole, double throw relay with a 24 VDC coil. The coil resistance is 577 Ω and the contact rating is 20A at 240 VAC. When 24 VDC is applied to the coil, the normally open contacts (7 & 4 or C & NO) close applying line voltage to the burner transformer and the combustion blower.

Testing Procedure

1. Disconnect line voltage to the unit.
2. Take a resistance reading of the coil.
3. If coil resistance is correct (577 Ω):
   a) Apply line voltage to the unit.
   b) Check for 24 VDC at the coil of the relay when the unit is calling for heat.
   c) Check the state of the contacts.
   -If the normally open contacts (7 & 4 or C & NO) are closed when coil voltage is applied, the K3 relay is functioning normally.
   -If the normally open contacts (7 & 4 or C & NO are not closed when coil voltage is applied, the K3 relay is malfunctioning and must be replaced (page A-8).
4. If the coil resistance is incorrect, replace the K3 relay.

K4 Relay - Ignition

The K4 relay is a single pole, double throw relay with a 24 VAC coil. The coil resistance is 585 k Ω and the contact rating is 20 A at 240 VAC. When 24 VAC is applied to the coil, the normally open contacts (7 & 4 or C & NO) close and the normally closed contacts (7 & 1 or C & NC) open.

The K4 relay uses the normally closed contacts. If 24 VAC is applied to the ignition module and 1.5 *u*A minimum is not maintained, the ignition module applies 24 VAC to the relay and the contacts open. When the contacts open the I/O control board shows an "F3 No Flame" fault.

Testing Procedure

1. Disconnect line voltage to the unit.
2. Take a resistance reading of the K4 coil.

3. If coil resistance is correct (585 k Ω):
   a) Apply line voltage to the unit.
   b) Check for 24 VAC at the coil of the relay when the unit is calling for heat.
   c) Check the state of the contacts.
   -If the normally open contacts (7 & 4 or C & NO) are closed and the normally closed contacts (7 & 1 or C & NC) are open when coil voltage is applied, the K4 relay is functioning normally.
   -If the normally open contacts (7 & 4 or C & NO) are not closed and/or the normally closed contacts (7 & 1 or C & NC) are not open when coil voltage is applied, the K4 relay is malfunctioning and must be replaced.
4. If the coil resistance is incorrect, replace the K4 relay (page A-14).

RTD

The RTD is a resistance temperature detector used to detect the cavity temperature.

Testing Procedure

1. Disconnect the RTD from the I/O control board.
2. Place the RTD in a bowl of ice water for 2 minutes.
3. Take a resistance reading of the RTD.
4. If RTD resistance is not 100 Ω, RTD is defective and must be replaced.

NOTE: Use Figure 29, page 24 to determine resistance readings at temperatures other than freezing.

Smart Card Reader

The smart card reader allows the oven operator to load a menu/firmware update from a smart card. A menu that already exists in the oven can also be saved to a smart card. For instructions, see page 15.

Speaker

The speaker is separate from the control board, and provides audible feedback to the oven operator whenever a key is pressed or a fault occurs.

Thermostat - 120ºF (Close on Rise)

The cooling fan thermostat actuates the cooling fans when the temperature in the left end bell reaches 120ºF (49ºC).

Wire Harness

The wire harness distributes power to the oven's electrical components. See page 45 for a schematic.

The Conveyor System

This section contains information about the following components, as well as testing procedures:

- Gear Drive (Conveyor Motor)
- Gear Drive (Conveyor Motor) Speed Controller (CMSC)

Gear Drive (Conveyor Motor)

The conveyor motor is a 1550 RPM, 3-phase motor with a built in Hall Effect Sensor. The speed of the conveyor motor is controlled by the voltage frequency applied to the windings from the CMSC. The Hall Effect Sensor sends a DC pulse back to the control board to verify motor speed. The control board uses these pulses to determine the output DC voltage to the CMSC.

Conveyor ovens with a split-belt configuration will contain separate gear motors and speed controllers for each belt.

Testing Procedure

1. Disconnect line voltage from the unit.
2. Take a resistance reading of the motor windings and use Figure 30, page 24 to verify that the resistance readings are correct.

3. If the resistance readings are correct, reconnect the motor wiring and then apply line voltage to the unit and check for voltage applied to the motor windings.
4. If no voltage is present, ensure the CMSC is operating properly (see below).
5. If CMSC is operating properly, inspect the wire harness for damage or shorts.
6. If the wire harness is intact and undamaged, and the CMSC is operating properly, the gear drive is damaged or defective and must be replaced (page A-8).

Gear Drive (Conveyor Motor) Speed Controller (CMSC)

The CMSC converts single-phase line voltage to a three-phase output. The speed of the gear drive is controlled by the frequency output of the CMSC. The CMSC receives an input voltage (0-10 VDC) from the control board and adjusts the frequency output to the gear drive.

Testing Procedure

⚠ WARNING: Capacitors within the CMSC can retain charge after power is removed. Exercise extreme caution when handling the terminals.

⚠ WARNING: DO NOT connect incoming AC power to output terminals U, V, or W. This will seriously damage the Conveyor Motor Speed Controller.

1. Ensure that no faults appear on the display of the CMSC during oven operation. The control will display the frequency output if the system is operating correctly.
2. Check the input voltage on terminals L1 & L2 and the DC voltage input on terminals 0V & AI (0.1-10 VDC).
3. Check ohms of motor (Figure 30).
4. If no voltage is present, inspect the wire harness for damage or shorts (page 45).
5. If wire harness is intact and undamaged, the CMSC is damaged or defective and must be replaced.

°F	0°	+20°	+40°	+60°	+80°	+100°	+120°	+140°	+160°	+180°	+200°
0°	90.03Ω	97.39Ω	101.74Ω	106.07Ω	110.38Ω	114.68Ω	118.97Ω	123.24Ω	127.50Ω	131.74Ω	135.97Ω
+200°	135.97Ω	140.18Ω	144.38Ω	148.57Ω	152.74Ω	159.90Ω	161.04Ω	165.17Ω	169.29Ω	173.39Ω	177.47Ω
+400°	177.47Ω	181.54Ω	185.60Ω	189.64Ω	193.67Ω	197.69Ω	201.69Ω	205.67Ω	209.64Ω	213.60Ω	217.54Ω
+600°	217.54Ω	221.47Ω	225.38Ω	229.28Ω	233.17Ω	237.04Ω	240.90Ω	244.74Ω	248.57Ω	252.38Ω	256.18Ω

°C	0°	+10°	+20°	+30°	+40°	+50°	+60°	+70°	+80°	+90°	+100°
0°	100.00Ω	103.90Ω	107.79Ω	111.67Ω	115.54Ω	119.40Ω	123.24Ω	127.07Ω	130.89Ω	134.70Ω	138.50Ω
+100°	138.50Ω	142.29Ω	146.06Ω	149.82Ω	153.58Ω	157.31Ω	161.04Ω	164.76Ω	168.46Ω	172.16Ω	175.84Ω
+200°	175.84Ω	175.91Ω	183.17Ω	186.82Ω	190.45Ω	194.07Ω	197.69Ω	201.29Ω	204.88Ω	208.45Ω	212.02Ω
+300°	212.02Ω	215.57Ω	219.12Ω	222.65Ω	226.17Ω	229.67Ω	233.17Ω	236.65Ω	240.13Ω	243.59Ω	247.04Ω

Figure 29: Temperature/Resistance Relationship Class B. Resistance @ 0°C = 100.0, Alpha = 0.003850

To	From	Description	Expected Resistance
White	Grey	Winding (A-B)	215-217 Ω
White	Black	Winding (A-C)	215-217 Ω
Grey	Black	Winding (B-C)	215-217 Ω
Black, Brown, or Blue	Green	Windings to chassis	Open

Figure 30: Conveyor Motor Ohm Chart

Accessing Parameters

⚠ WARNING: DO NOT perform this procedure unless instructed by TurboChef.Changing the parameters to other than those preset by TurboChef can damage critical oven components.

NOTE: "Motor Rated Speed" (07) is RPM of motor before gearbox, not after.

1. Open the right end bell (page 1).
2. Locate the CMSC (page A-8).
3. Press the Ⓜ key.
4. Use the ⌃ and ⌄ keys to navigate the parameters.
5. Press the Ⓜ key to access the parameter shown on the CMSC display.
6. Use the ⌃ and ⌄ keys to manipulate the parameter.
7. Press the Ⓜ key to return to the parameter selection.
8. Repeat steps 4-7 to manipulate other parameters as needed.

The Blower System

This section contains information about and testing procedures for the following components:

-Blower Motor
-Blower Motor Speed Controller (BMSC)

Blower Motor

The main blowers are 3400 RPM, 3-phase blower motors. The speed of the blower motor is controlled by the voltage frequency applied to the motor windings from the blower motor speed controller (BMSC).

Testing Procedure

1. Disconnect line voltage from the unit.
2. Take a resistance reading of the motor windings and use Figure 31 to verify the resistance readings are correct.
3. If the resistance readings are correct, reconnect motor wiring and then apply line voltage to the unit and check for voltage applied to the motor windings.
4. If no voltage is present, ensure the BMSC is operating properly (see below).
5. If BMSC is operating properly, inspect the wire harness for damage or shorts (page 45).
6. If wire harness is intact and undamaged and the BMSC is operating properly, the blower motor is damaged or defective and must be replaced (page A-8 = lower, A-12 = upper).

Blower Motor Speed Controller (BMSC)

The BMSC converts single-phase line voltage (208-240 VAC) to a three-phase output. The speed of the blower motor is controlled by the frequency output of the BMSC. The BMSC receives an input voltage (0-10 VDC) from the I/O control board and adjusts the frequency output to the blower motor.

Testing Procedure

⚠ CAUTION: Capacitors on the BMSC may retain charge after power is removed. To discharge capacitors for further safety, short B+ and B- together.

⚠ WARNING: DO NOT connect incoming AC power to output terminals U, V, or W or terminals B+ or B-. This will seriously damage the BMSC.

1. Ensure that no faults appear on the display during the operation of the BMSC. The control will display the frequency output if the system is operating correctly.

To	From	Description	Expected Resistance
Blue	Brown	Winding (A-B)	5.1-5.5 Ω
Blue	White	Winding (A-C)	5.1-5.5 Ω
Brown	White	Winding (B-C)	5.1-5.5 Ω
Blue, Brown, or White	Green	Windings to chassis	Open

Figure 31: Blower Motor Ohm Chart (Motor Windings)

2. Check the input voltage on terminals L1 & L2 (208-240 VAC) and the DC voltage input on terminals 2 & 5 (0.1-10 VDC).
3. If no voltage is present, inspect the wire harness for damage or shorts (page 45).
4. If wire harness is intact and undamaged, the BMSC is damaged or defective and must be replaced (page A-8 = lower, A-12 = upper).

Accessing Parameters

⚠ WARNING: DO NOT perform this procedure unless instructed by TurboChef.Changing the parameters to other than those preset by TurboChef can damage critical oven components.

1. Open the right or left end bell depending on which BMSC requires testing (page 1, A-1).
2. Locate the BMSC (page A-1).
3. Press the MODE key.
4. Use the ▲▼ keys to navigate the parameters.
5. Press the MODE key to access the parameter shown on the BMSC display.
6. Use the ▲▼ keys to manipulate the parameter.
7. Press the MODE key to return to the parameter selection.
8. Repeat steps 4-7 to manipulate other parameters as needed.

The Burner System

This section contains information about and testing procedures for the following components:
- Air Pressure Switch
- Burner Transformer
- Combustion Blower
- Modulating Gas Valve
- Ignition Module

Air Pressure Switch

The air pressure switch contacts close when a 0.1in WC (2.54mm WC) differential exists between the two ports. The air pressure switch has one negative port and one positive. The air tube from the combustion blower is attached to the positive port. The air tube must not be damaged in any way (cracked or split). The connection must be tight at the combustion blower and the switch itself to ensure proper operation of the air pressure switch.

Testing Procedure

1. Attach a digital manometer to the air tube coming from the combustion blower.
2. A reading above 0.1in WC (2.54mm WC) is required to close the contacts. If the reading is below 0.1in WC (2.54mm WC), check the combustion blower operation.

Burner Transformer

The burner transformer converts incoming line voltage to 24 VAC output.

Testing Procedure

1. Disconnect line voltage to the burner transformer.
2. Remove the burner transformer lead wires.
3. Check the resistance of the primary and secondary windings, refer to Figure 33, to determine if the transformer is functioning properly.
4. Set up the wire configuration for 208 or 240:
   - 208 VAC installation: connect wire B (blue) to wire C (blue). Figure 32, below, is configured for 208 VAC operation.
   - 240 VAC installation: connect wire A (red) to wire C (blue).

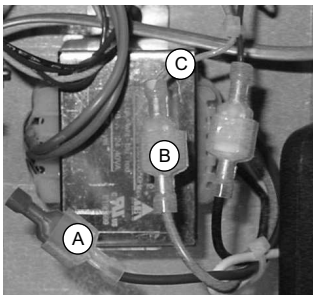


Figure 32: Burner Transformer Wires

	To	From	Expected Resistance
Primary	Black	White (240 VAC Input)	28.1 Ω
	Black	Blue (240 VAC Input)	53.1 Ω
	Black	Red (240 VAC Input)	62.4 Ω
Secondary	Yellow	Yellow	0.80 Ω

Figure 33: Burner Transformer Ohm Chart

Combustion Blower

The combustion blower is a 3000 RPM, 208-240 VAC, 0.33 A, 50/60 hz, blower motor. The winding resistance is 92 Ω. The combustion blower receives line voltage (208-240 VAC) from the K3 relay. Once the combustion blower reaches full speed, the air pressure switch closes, applying 24 VAC to the ignition module.

Testing Procedure

1. Disconnect line voltage from the unit.
2. Take a resistance reading of the winding; resistance should be 92 Ω. If resistance is incorrect, the combustion blower is damaged or defective and must be replaced (page A-14).
3. Apply line voltage to the unit and check for line voltage (208-240 VAC) applied to the winding when the unit is calling for heat and the K3 relay is closed.
4. If no voltage is present, inspect the wire harness for damage or shorts (page 45).
5. If the wire harness is intact and undamaged, the combustion blower is damaged or defective and must be replaced (page A-14).

Modulating Gas Valve

The modulating gas valve is a combination gas valve with a 24 VAC primary solenoid valve and 0.1-10 VDC modulating valve. The primary solenoid valve receives 24 VAC from the ignition module. The resistance of the primary solenoid valve is 535 k Ω. The modulating valve receives 0.1-10 VDC from the control board. The resistance of the modulating valve is 44 Ω. The modulating valve has an adjustment shaft that adjusts the high and low flame pressure.

Testing Procedure

NOTE: See page 3 for instructions on adjusting the high and low flame gas pressure.

1. Disconnect line voltage from the unit.
2. Take a resistance reading of both coils, resistances should be 535k Ω and 44 Ω. If resistance is incorrect, the gas valve is damaged or defective and must be replaced (page A-14).
3. During warmup and cook mode, apply line voltage to the unit and check for 24 VAC at the primary solenoid coil and 0.1-10 VDC at the modulating valve coil.
4. If no voltage is present, inspect the wire harness for damage or shorts (page 45).
5. Check for 24 VAC leaving the ignition module (see Figure 35, page 28)
6. If wire harness is intact and undamaged, the modulating gas valve is damaged or defective and must be replaced (Pipe and valve assembly, page A-14).

Ignition Module

The ignition module generates 30,000 V at the spark igniter stud for direct ignition of the main burner when 24 VAC is applied. The module senses the presence of the burner flame and discontinues the ignition spark.

If the burner fails to ignite within 6 seconds, the module goes into safety lockout. If the burner does not maintain 1.5 DC *u*A minimum, the timed trial for ignition (6 seconds) is repeated and safety lockout occurs. If safety lockout occurs, power must be removed from the module before it can be restarted.

Testing Procedure

NOTE: The ignition module is different in domestic and international model ovens. Figure 34 shows the differences in the terminal labels between the two models.

1. Shut off the gas supply.
2. Disconnect the wire spark cable from the stud terminal of the ignition module. This will isolate the burner spark rod from the ignition module.
3. Using a different wire spark cable (ensure that the cable is not damaged in any way), attach one end to the stud terminal of the ignition module.
4. Touch the other end of the ignition cable to the ground terminal of the ignition module (DO NOT remove the existing ground lead from the ignition module).
5. Apply power to the ignition module.
6. Before the ignition module goes into a safety lockout (6 seconds), slowly move the end away from the ground terminal. A spark length of 1/8" (3 mm) or more indicates good ignition voltage. If there is no arc or the maximum spark length is less than 1/8" (3 mm), and the input voltage to the ignition module is 20-25 VAC, the ignition module is damaged or defective and must be replaced (page A-14).

Domestic	International
25 VAC	TH/W
25 V	V2 GND
Alarm	Not Used
Valve	V1/PV1
Valve	V2 GND
Ground	V2 GND

Figure 34: Ignition Module Terminal Differences

Testing Procedure for Testing Flame Rectification

Figure 35

1. Ensure the oven is in the off or cooling down mode (page 10).
2. Remove the flame signal ground wire from the ignition module.
3. Connect a DC multipurpose meter that is able to read micro amps (uA) in series with the flame signal ground wire.
   -Connect the red (+) meter lead to the free end of the flame signal ground wire.
   -Connect the black (-) meter lead to the quick connect flame signal ground wire terminal on the ignition module.
4. From the off or cooling down mode, select a cooking profile to operate the oven burner.
5. The reading must be above 1.5 DC uA and it must be steady.

The oven control system uses basic flame rectification to verify if a flame is present. The micro amps must be greater than 1.5 DC uA. If the reading is below 1.5 DC uA or is not steady, remove the burner assembly and investigate the cause. Look for a loose ignition/sensor wire, or defective sensor assembly. Follow the troubleshooting steps outlined on pages 34-35.

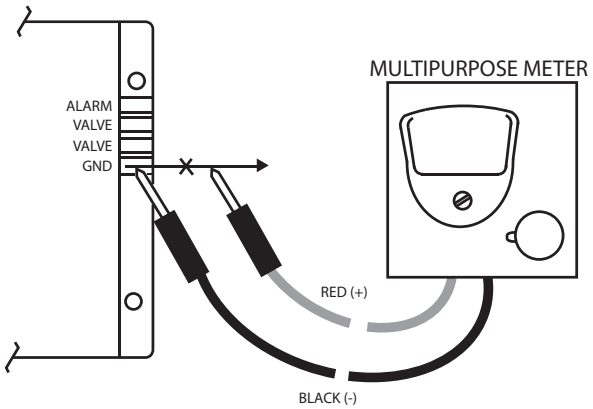


Figure 35: Measuring Microamps

Troubleshooting

Overview of Troubleshooting

This section contains information on the following:

- Fault code descriptions
- Fault code troubleshooting
- Non-fault code troubleshooting

Fault Code Descriptions

Fault codes are logged in a fault counter (page 16) for troubleshooting. Upon completing the service call and restoring successful operation of the oven, the technician should clear all faults (see page 20).

F1: Blower Failure

This fault is displayed if for three consecutive times the control board does not receive the "status OK" signal from the BMSC.

The fault is cleared from the display if the blowers successfully restart upon starting a cook cycle or in TEST MODE.

F2: Low Temp During Cook

The oven will emit a beeping noise and display this fault if the cook cavity temperature falls 25°F (14°C) below the current cooking profile's set temperature, and the fault will be logged in the fault counter.

The fault is cleared from the fault display if the cook cavity temperature returning to within 25°F (14°C) of the set cooking temperature during cooking or in TEST MODE.

F3: Flameout

This fault is displayed if the flame fails to light three consecutive times at startup, or once the oven reaches the cooking temperature, the flame goes out and fails to re-light three consecutive times.

The fault is cleared from the display if the flame succeeds to light when the user re-selects the cooking profile.

F4: Emergency Stop

This fault is displayed when the emergency stop key is pressed.

This fault acts as a counter that logs how many times the emergency stop key (page 9) has been pressed.

The fault is cleared from the display once the oven is restarted.

F5: CC Over Temp

This fault is displayed if the cook cavity's temperature reaches or exceeds 625°F (329.4°C).

The fault is cleared from the display once the oven is restarted and the temperature recedes below 625°F (329.4°C).

F6: EC Over Temp

This fault is displayed if the equipment chamber reaches 149°F (65°C); however, the oven will not shut down and the fault will not be logged in the fault count log unless the equipment chamber reaches 158°F (70°C).

The fault is cleared from the display when the equipment chamber temperature falls below 149°F (65°C).

F7: RTD Failure

This fault is displayed if the RTD circuit is open, shorted, reads above 645°F (340.5°C), or reads below -40°F (-40°C).

The fault is cleared from the display if the RTD circuit is closed, or the temperature reads within 645°F (340.5°C) and 40°F (-40°C)

F8: High Limit Tripped

This fault is displayed if the high limit switch trips. The switch trips when the high limit probe reads approximately 600°F (315.5°C).

The fault is cleared from the display when the high limit switch is manually reset.

F9: Belt Fault

This fault occurs if the conveyor belt fails to start.

The fault is cleared from the display if the conveyor belt starts when initiating cooking.

F10: Air Switch Fault

This fault occurs if the air pressure switch on the burner fails to close when the burner circuit is energized.

The fault is cleared from the display when the air pressure switch closes after the burner circuit is energized.

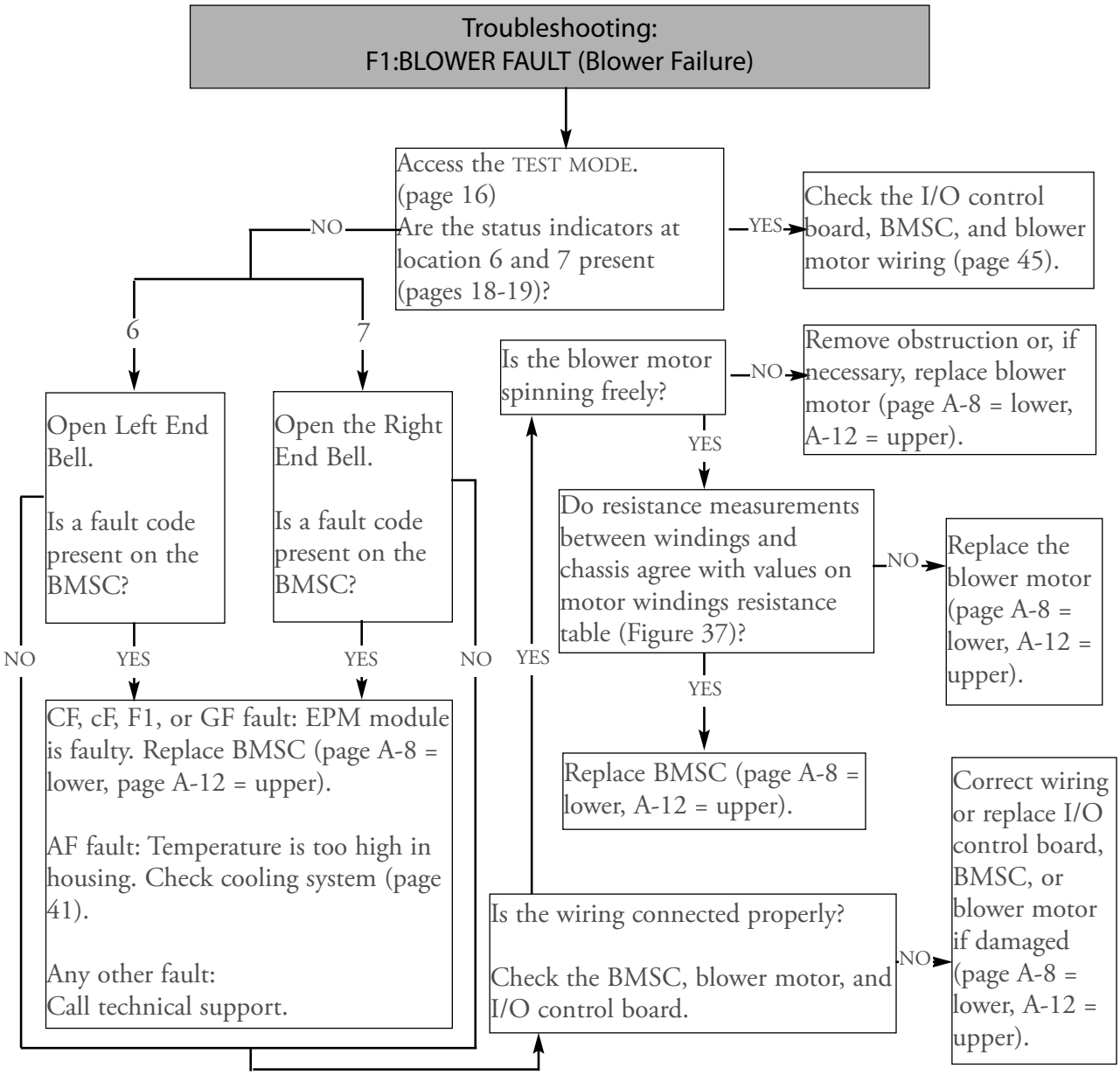
Fault Code and Description	When Active				Refer to...
	Warming	Idle	Cooking	Test	
F1: Blower Failure	✔	✔	✔	✔	Page 31
F2: Low Temp During Cook			✔		Page 32
F3: Flameout	✔	✔	✔	✔	Page 34
F4: Emergency Stop	✔	✔	✔	✔	N/A
F5: CC Over Temp			✔	✔	Page 36
F6: EC Over Temp	✔	✔	✔	✔	Page 37
F7: RTD Failure	✔	✔	✔	✔	Page 38
F8: High Limit Tripped			✔	✔	Page 38
F9: Belt Fault	✔	✔	✔		Page 39
F10: Air Switch Fault	✔	✔	✔	✔	Page 40

Figure 36: Fault Code Table

NOTE: All fault codes, except F2 and F9 will terminate cooking upon discovery. Any fault that occurs will be logged in the in the fault count log (page 16), except F6.

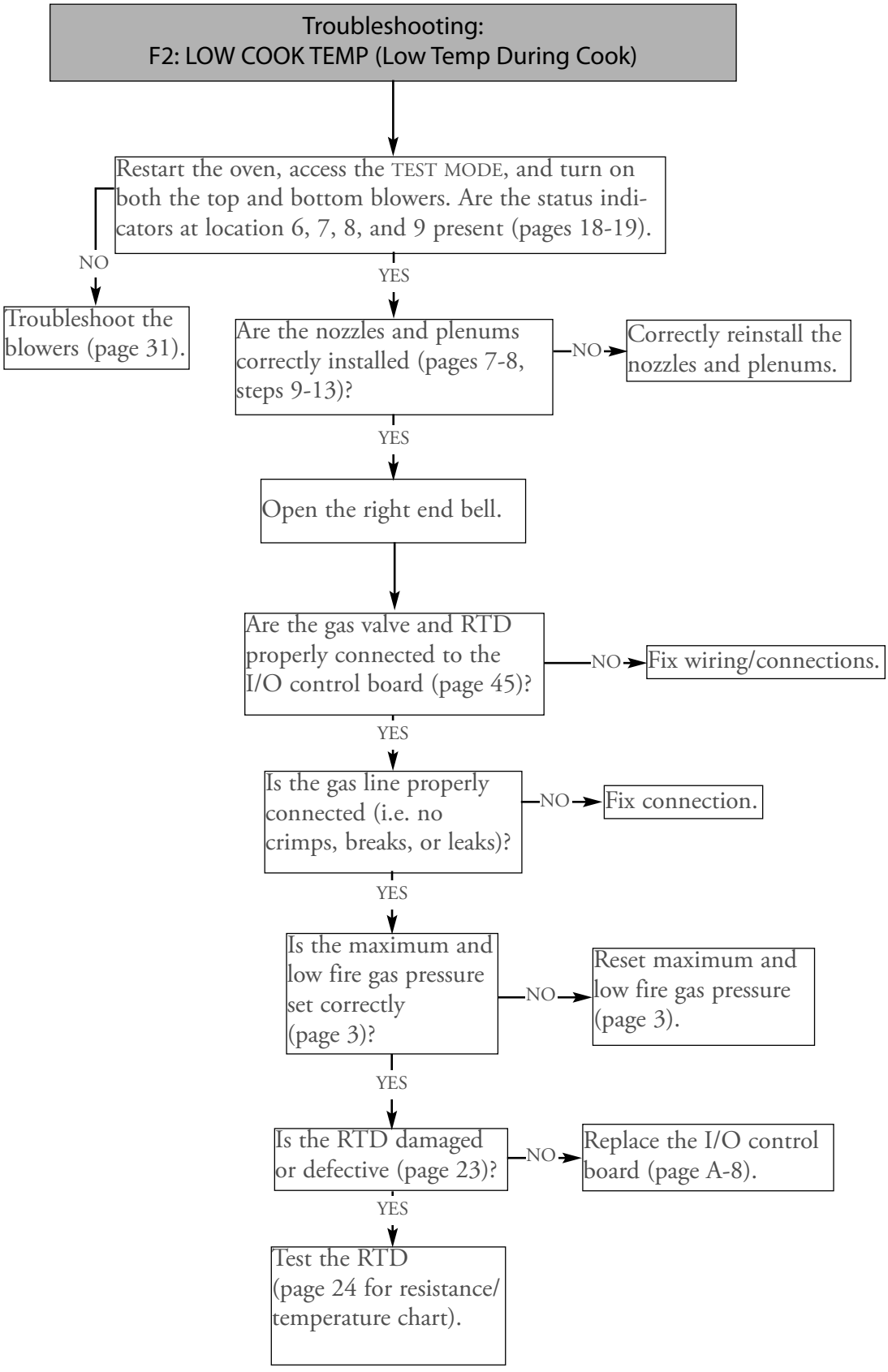
Fault Code Troubleshooting

From TEST MODE, you can test separate oven components to help diagnose an issue. To access TEST MODE, see page 16.


Troubleshooting:
F1:BLOWER FAULT (Blower Failure)
Access the TEST MODE. (page 16) Are the status indicators at location 6 and 7 present (pages 18-19)?
NO
YES
Check the I/O control board, BMSC, and blower motor wiring (page 45).
6
7
Open Left End Bell.
Is a fault code present on the BMSC?
Open the Right End Bell.
Is a fault code present on the BMSC?
NO
YES
YES
NO
CF, cF, F1, or GF fault: EPM module is faulty. Replace BMSC (page A-8 = lower, page A-12 = upper).
AF fault: Temperature is too high in housing. Check cooling system (page 41).
Any other fault:
Call technical support.
Is the blower motor spinning freely?
NO
Remove obstruction or, if necessary, replace blower motor (page A-8 = lower, A-12 = upper).
YES
Do resistance measurements between windings and chassis agree with values on motor windings resistance table (Figure 37)?
NO
Replace the blower motor (page A-8 = lower, A-12 = upper).
YES
Replace BMSC (page A-8 = lower, A-12 = upper).
Is the wiring connected properly?
Check the BMSC, blower motor, and I/O control board.
NO
Correct wiring or replace I/O control board, BMSC, or blower motor if damaged (page A-8 = lower, A-12 = upper).

To	From	Description	Expected Resistance
Blue	Brown	Winding (A-B)	5.1-5.5 W
Blue	White	Winding (A-C)	5.1-5.5 W
Brown	White	Winding (B-C)	5.1-5.5 W
Blue, Brown, or White	Green	Windings to chassis	Open

Figure 37: Motor Windings Resistance Table


Troubleshooting:
F2: LOW COOK TEMP (Low Temp During Cook)
Restart the oven, access the TEST MODE, and turn on both the top and bottom blowers. Are the status indicators at location 6, 7, 8, and 9 present (pages 18-19).
NO
Troubleshoot the blowers (page 31).
YES
Are the nozzles and plenums correctly installed (pages 7-8, steps 9-13)?
NO
Correctly reinstall the nozzles and plenums.
YES
Open the right end bell.
Are the gas valve and RTD properly connected to the I/O control board (page 45)?
NO
Fix wiring/connections.
YES
Is the gas line properly connected (i.e. no crimps, breaks, or leaks)?
NO
Fix connection.
YES
Is the maximum and low fire gas pressure set correctly (page 3)?
NO
Reset maximum and low fire gas pressure (page 3).
YES
Is the RTD damaged or defective (page 23)?
NO
Replace the I/O control board (page A-8).
YES
Test the RTD (page 24 for resistance/ temperature chart).

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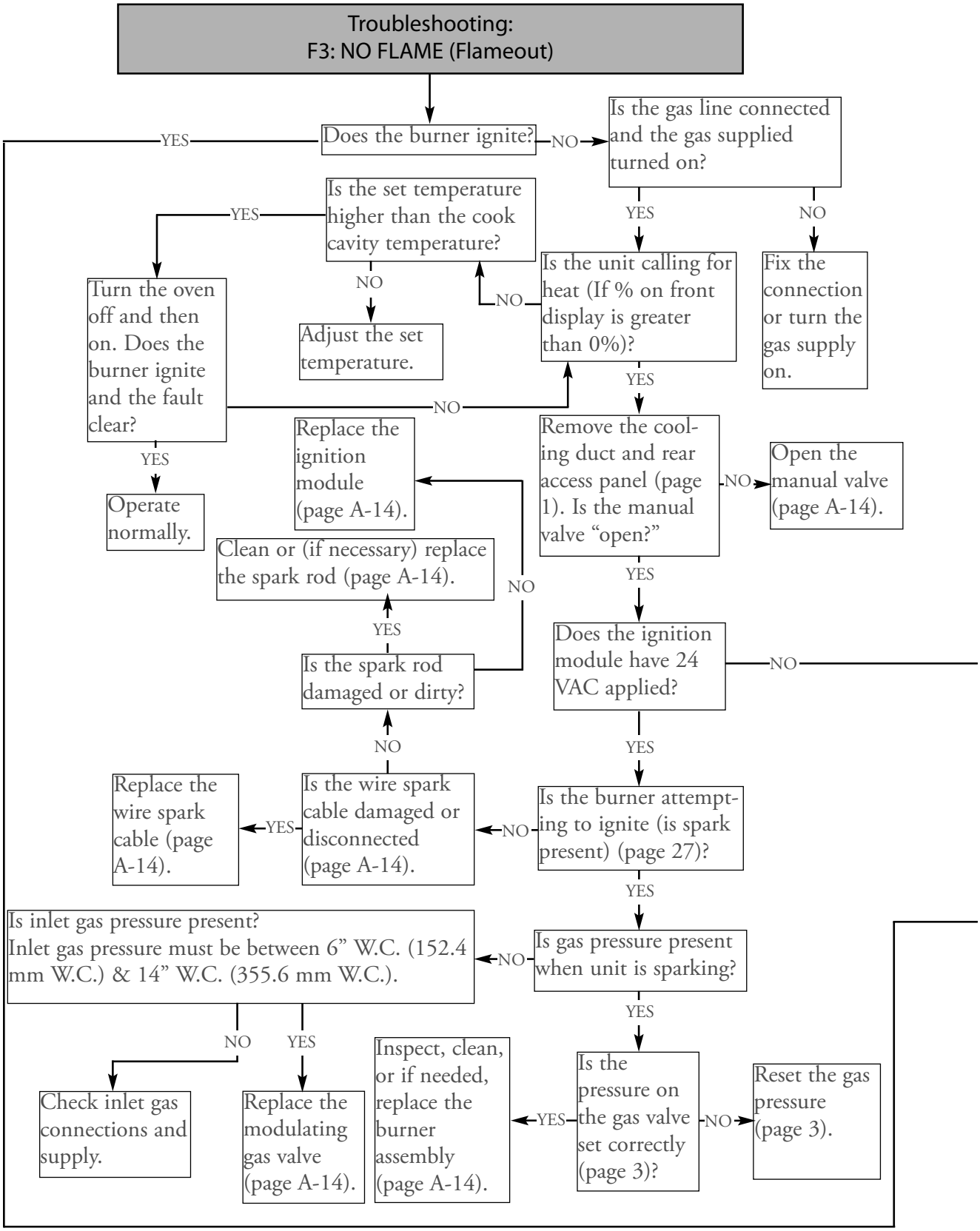
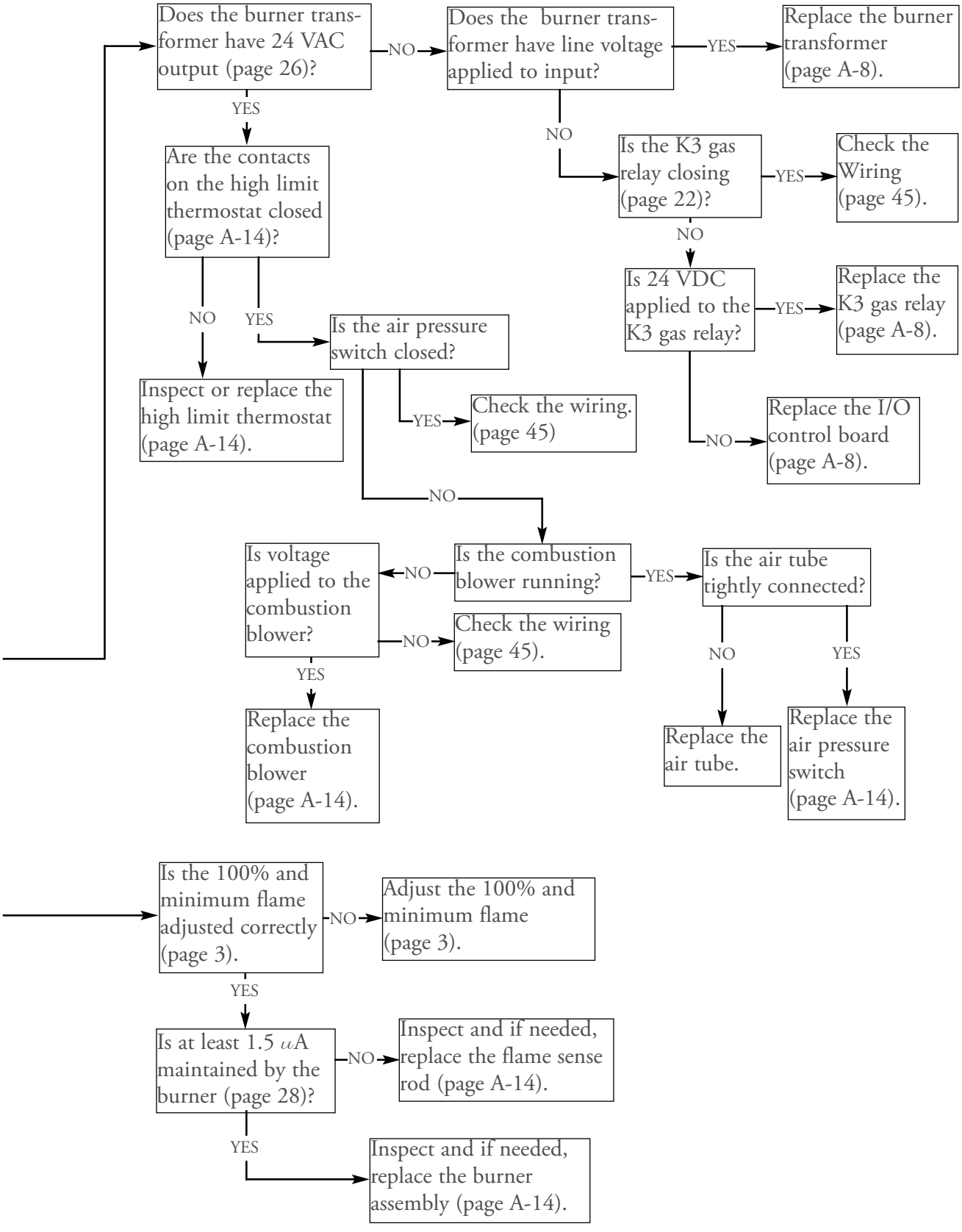
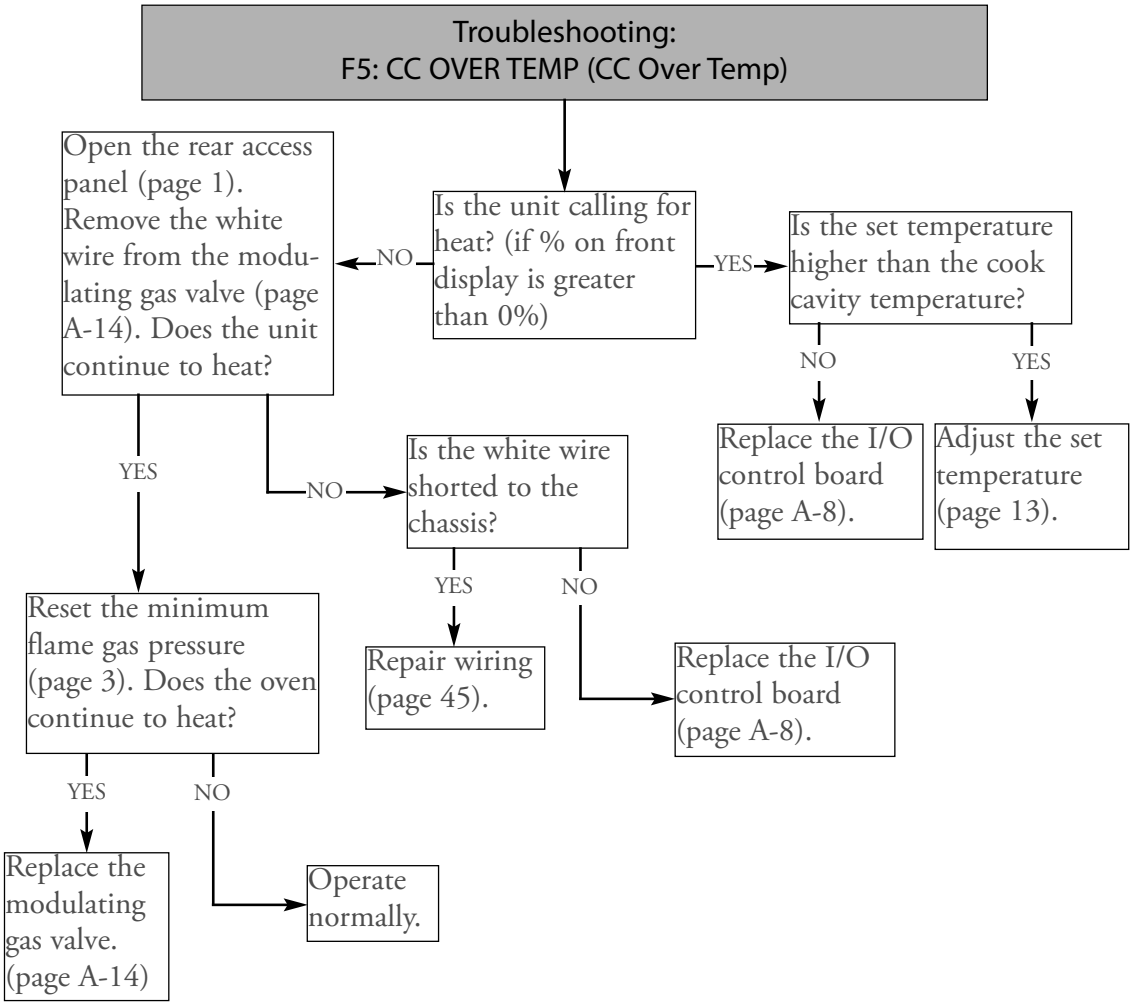
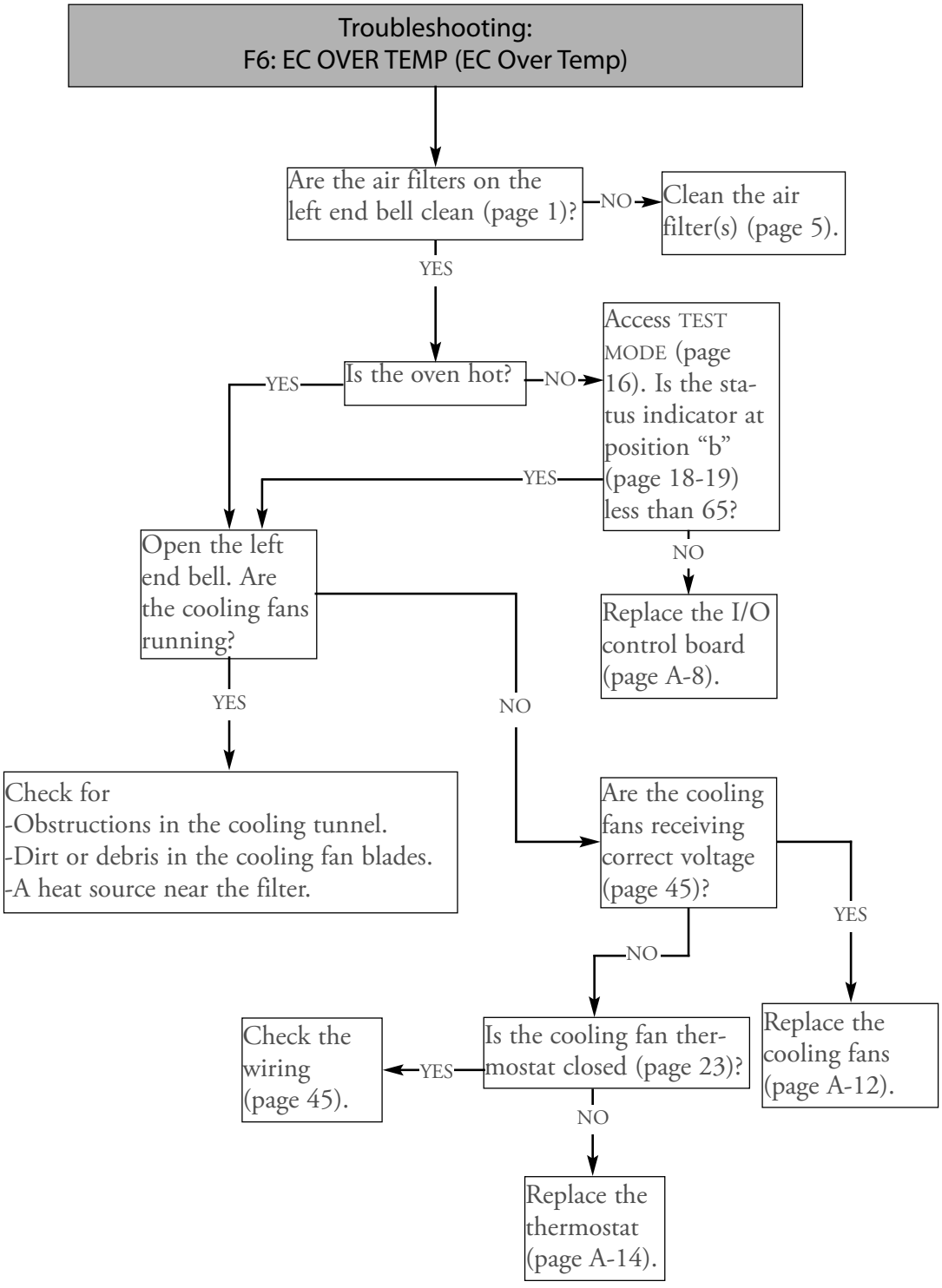
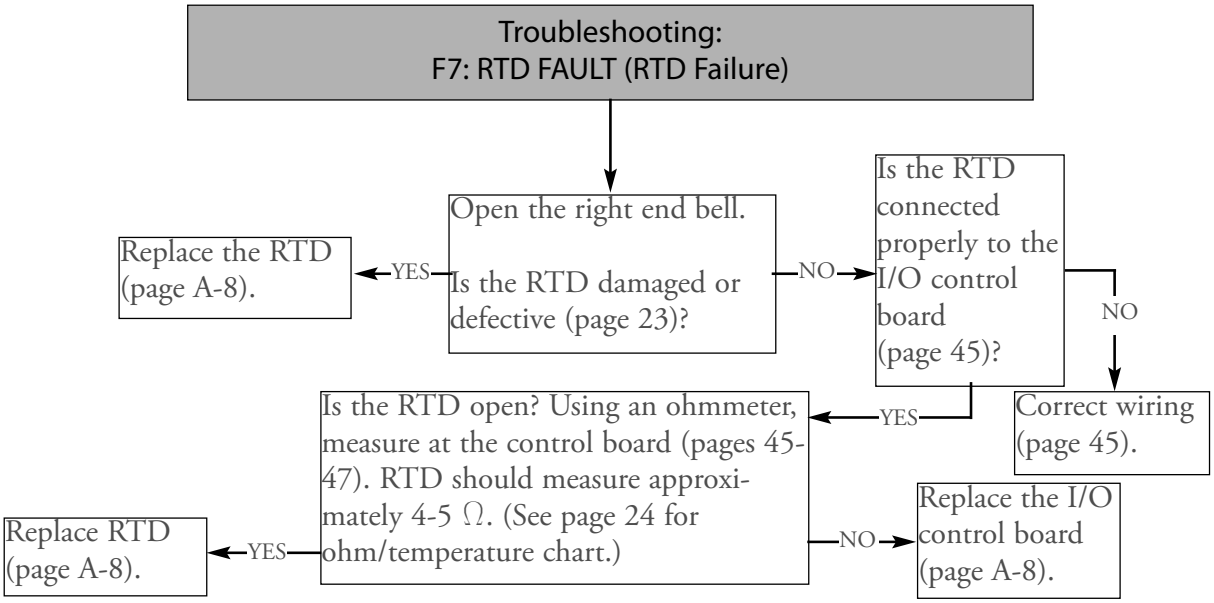
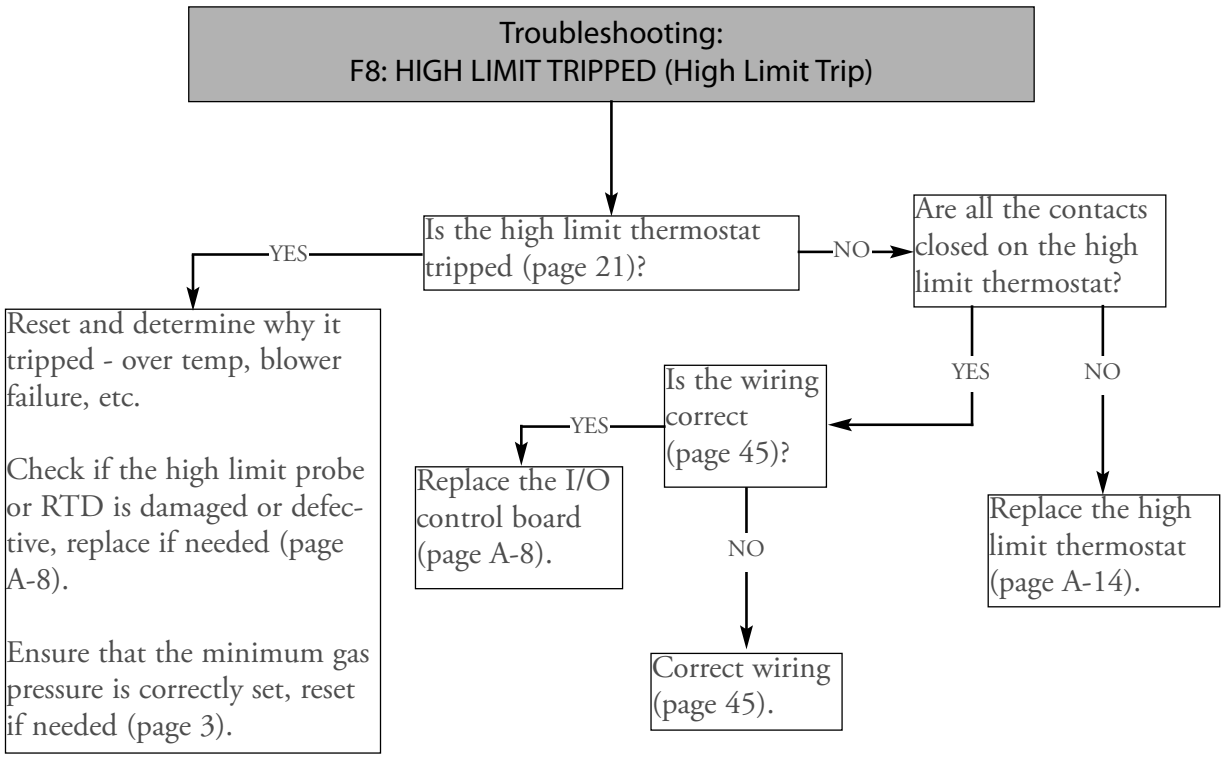

Troubleshooting:
F3: NO FLAME (Flameout)
Does the burner ignite?
YES
NO
Is the gas line connected and the gas supplied turned on?
YES
NO
Fix the connection or turn the gas supply on.
Is the unit calling for heat (If % on front display is greater than 0%)?
NO
YES
Is the set temperature higher than the cook cavity temperature?
YES
NO
Adjust the set temperature.
Turn the oven off and then on. Does the burner ignite and the fault clear?
NO
YES
Operate normally.
Remove the cooling duct and rear access panel (page 1). Is the manual valve "open?"
NO
Open the manual valve (page A-14).
YES
Does the ignition module have 24 VAC applied?
NO
YES
Replace the ignition module (page A-14).
Clean or (if necessary) replace the spark rod (page A-14).
NO
YES
Is the spark rod damaged or dirty?
NO
YES
Is the wire spark cable damaged or disconnected (page A-14).
YES
NO
Replace the wire spark cable (page A-14).
Is the burner attempting to ignite (is spark present) (page 27)?
YES
Is gas pressure present when unit is sparking?
NO
YES
Is inlet gas pressure present?
Inlet gas pressure must be between 6" W.C. (152.4 mm W.C.) & 14" W.C. (355.6 mm W.C.).
NO
YES
Check inlet gas connections and supply.
Replace the modulating gas valve (page A-14).
Inspect, clean, or if needed, replace the burner assembly (page A-14).
YES
Is the pressure on the gas valve set correctly (page 3)?
NO
Reset the gas pressure (page 3).

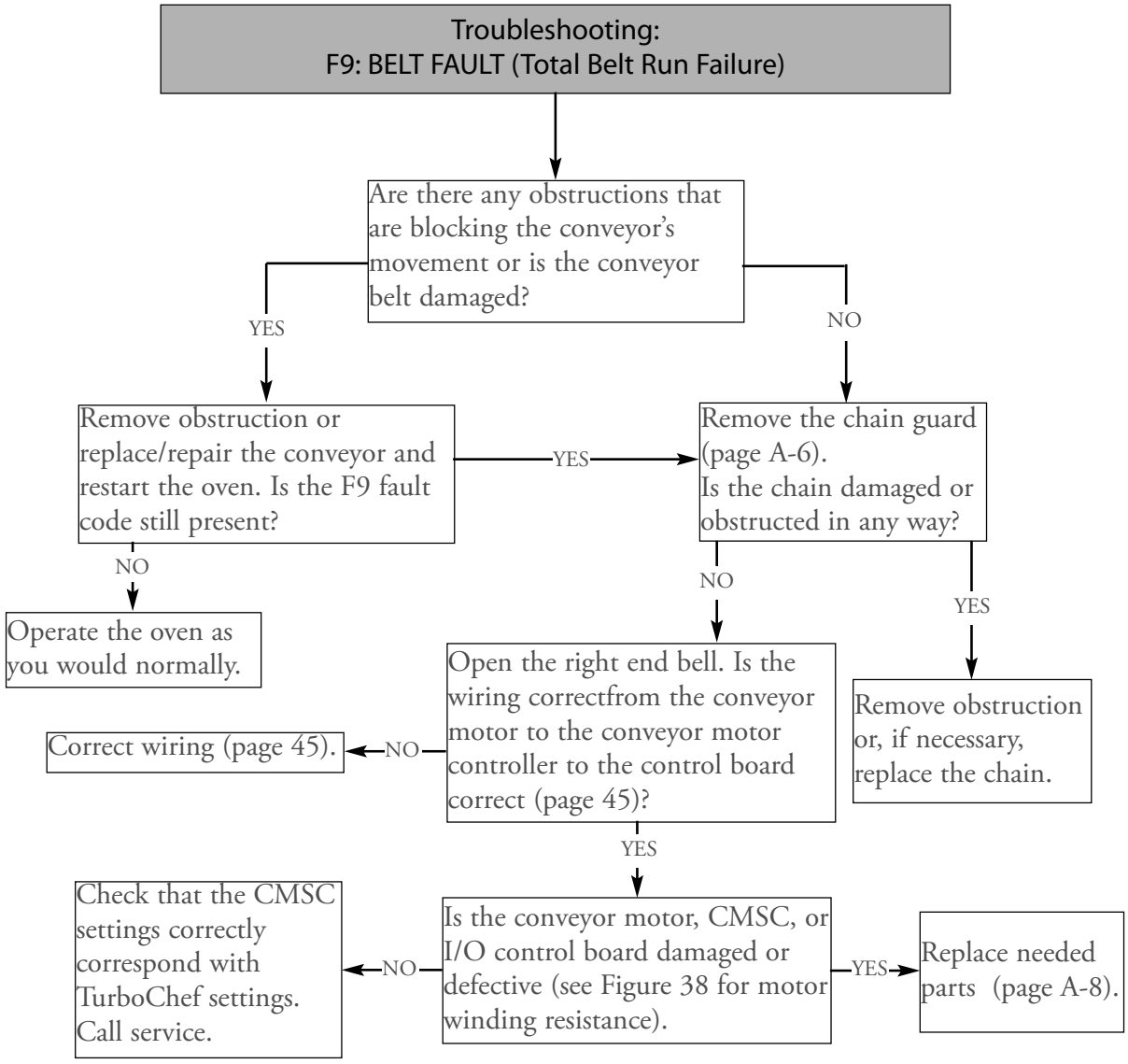

Does the burner transformer have 24 VAC output (page 26)?
NO
Does the burner transformer have line voltage applied to input?
YES
Replace the burner transformer (page A-8).
YES
NO
Are the contacts on the high limit thermostat closed (page A-14)?
Is the K3 gas relay closing (page 22)?
YES
Check the Wiring (page 45).
NO
Is 24 VDC applied to the K3 gas relay?
YES
Replace the K3 gas relay (page A-8).
NO
YES
Is the air pressure switch closed?
Inspect or replace the high limit thermostat (page A-14).
YES
Check the wiring. (page 45)
NO
Replace the I/O control board (page A-8).
NO
Is voltage applied to the combustion blower?
NO
Is the combustion blower running?
YES
Is the air tube tightly connected?
NO
Check the wiring (page 45).
YES
NO
YES
Replace the combustion blower (page A-14).
Replace the air tube.
Replace the air pressure switch (page A-14).
Is the 100% and minimum flame adjusted correctly (page 3).
NO
Adjust the 100% and minimum flame (page 3).
YES
Is at least 1.5 uA maintained by the burner (page 28)?
NO
Inspect and if needed, replace the flame sense rod (page A-14).
YES
Inspect and if needed, replace the burner assembly (page A-14).


Troubleshooting:
F5: CC OVER TEMP (CC Over Temp)
Is the unit calling for heat? (if % on front display is greater than 0%)
NO
YES
Open the rear access panel (page 1). Remove the white wire from the modulating gas valve (page A-14). Does the unit continue to heat?
Is the set temperature higher than the cook cavity temperature?
NO
YES
Replace the I/O control board (page A-8).
Adjust the set temperature (page 13).
YES
NO
Is the white wire shorted to the chassis?
YES
NO
Repair wiring (page 45).
Replace the I/O control board (page A-8).
Reset the minimum flame gas pressure (page 3). Does the oven continue to heat?
YES
NO
Replace the modulating gas valve. (page A-14)
Operate normally.


Troubleshooting:
F6: EC OVER TEMP (EC Over Temp)
Are the air filters on the left end bell clean (page 1)?
NO
Clean the air filter(s) (page 5).
YES
Is the oven hot?
YES
NO
Access TEST MODE (page 16). Is the status indicator at position "b" (page 18-19) less than 65?
YES
NO
Replace the I/O control board (page A-8).
Open the left end bell. Are the cooling fans running?
YES
NO
Check for
-Obstructions in the cooling tunnel.
-Dirt or debris in the cooling fan blades.
-A heat source near the filter.
Are the cooling fans receiving correct voltage (page 45)?
YES
NO
Replace the cooling fans (page A-12).
Is the cooling fan thermostat closed (page 23)?
YES
Check the wiring (page 45).
NO
Replace the thermostat (page A-14).

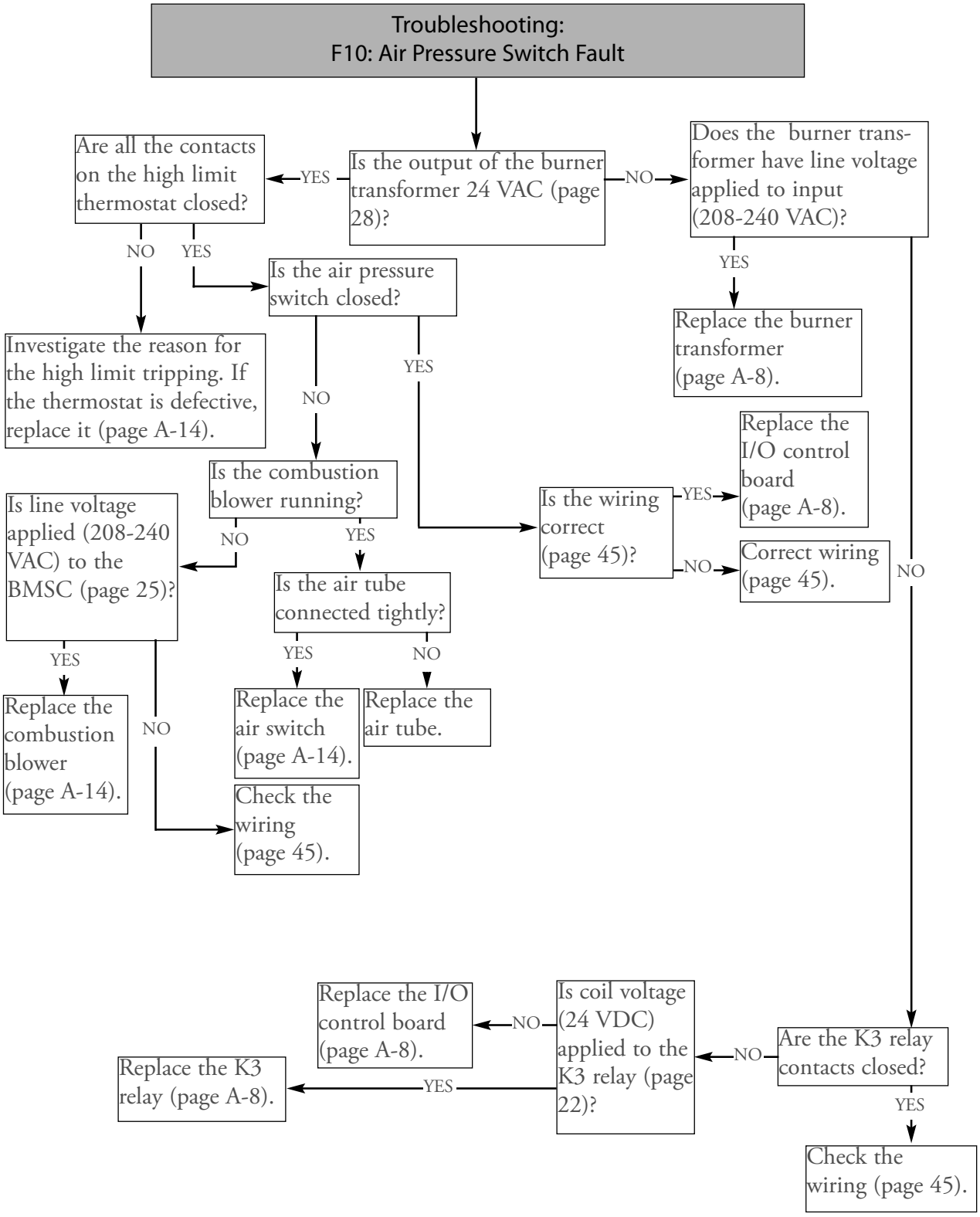

Troubleshooting:
F7: RTD FAULT (RTD Failure)
Open the right end bell.
Is the RTD damaged or defective (page 23)?
YES
Replace the RTD (page A-8).
NO
Is the RTD connected properly to the I/O control board (page 45)?
NO
Correct wiring (page 45).
YES
Is the RTD open? Using an ohmmeter, measure at the control board (pages 45-47). RTD should measure approximately 4-5 Ω. (See page 24 for ohm/temperature chart.)
YES
Replace RTD (page A-8).
NO
Replace the I/O control board (page A-8).


Troubleshooting:
F8: HIGH LIMIT TRIPPED (High Limit Trip)
Is the high limit thermostat tripped (page 21)?
YES
Reset and determine why it tripped - over temp, blower failure, etc.
Check if the high limit probe or RTD is damaged or defective, replace if needed (page A-8).
Ensure that the minimum gas pressure is correctly set, reset if needed (page 3).
NO
Are all the contacts closed on the high limit thermostat?
YES
Is the wiring correct (page 45)?
YES
Replace the I/O control board (page A-8).
NO
Correct wiring (page 45).
NO
Replace the high limit thermostat (page A-14).


Troubleshooting:
F9: BELT FAULT (Total Belt Run Failure)
Are there any obstructions that are blocking the conveyor's movement or is the conveyor belt damaged?
YES
NO
Remove obstruction or replace/repair the conveyor and restart the oven. Is the F9 fault code still present?
YES
Remove the chain guard (page A-6). Is the chain damaged or obstructed in any way?
NO
Operate the oven as you would normally.
NO
YES
Open the right end bell. Is the wiring correctfrom the conveyor motor to the conveyor motor controller to the control board correct (page 45)?
Remove obstruction or, if necessary, replace the chain.
Correct wiring (page 45).
NO
YES
Is the conveyor motor, CMSC, or I/O control board damaged or defective (see Figure 38 for motor winding resistance).
Check that the CMSC settings correctly correspond with TurboChef settings. Call service.
NO
YES
Replace needed parts (page A-8).

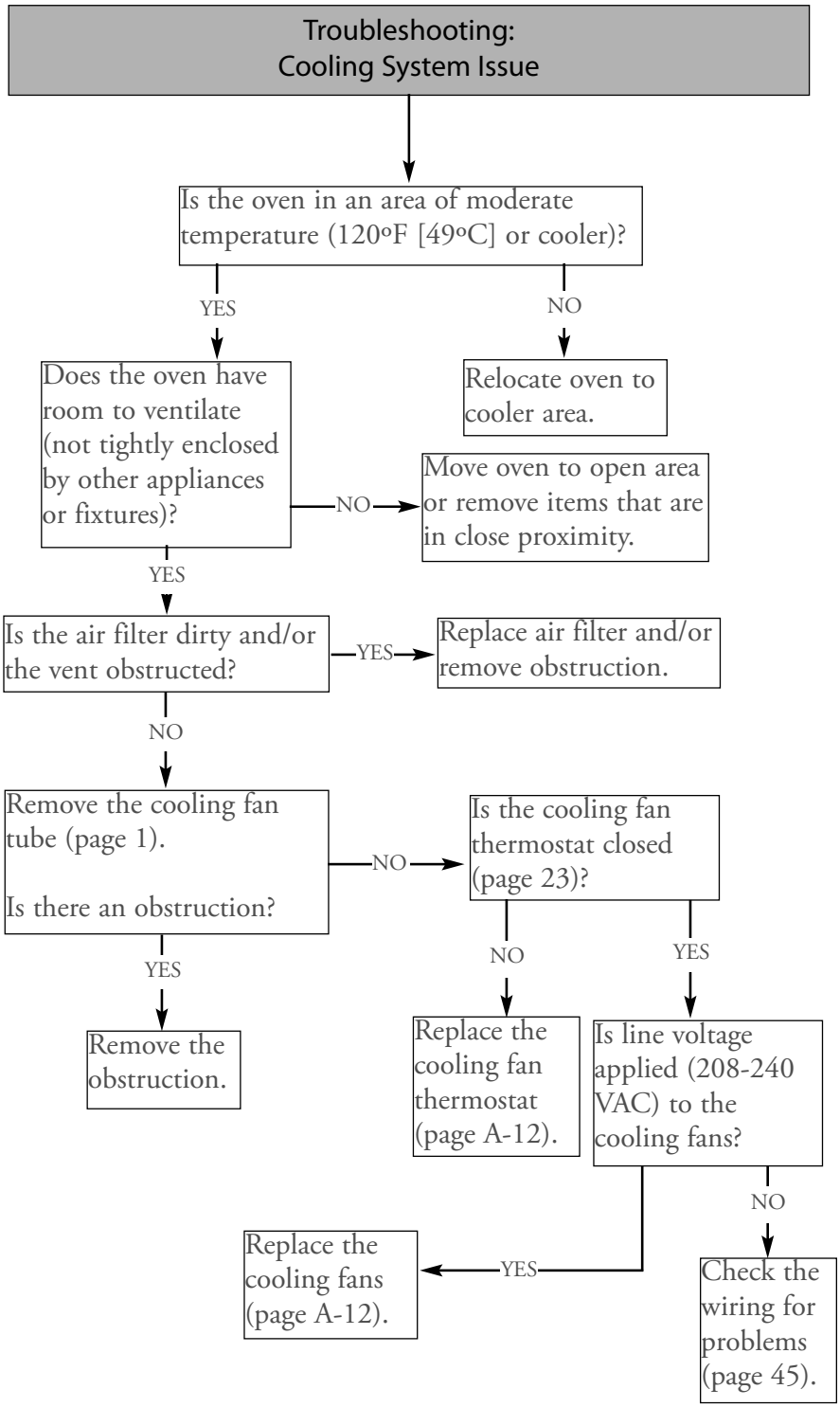
To	From	Description	Expected Resistance
White	Gray	Winding (A-B)	215-217 W
White	Black	Winding (A-C)	215-217 W
Gray	Black	Winding (B-C)	215-217 W
White, Gray, or Black	Chassis	Windings to chassis	Open

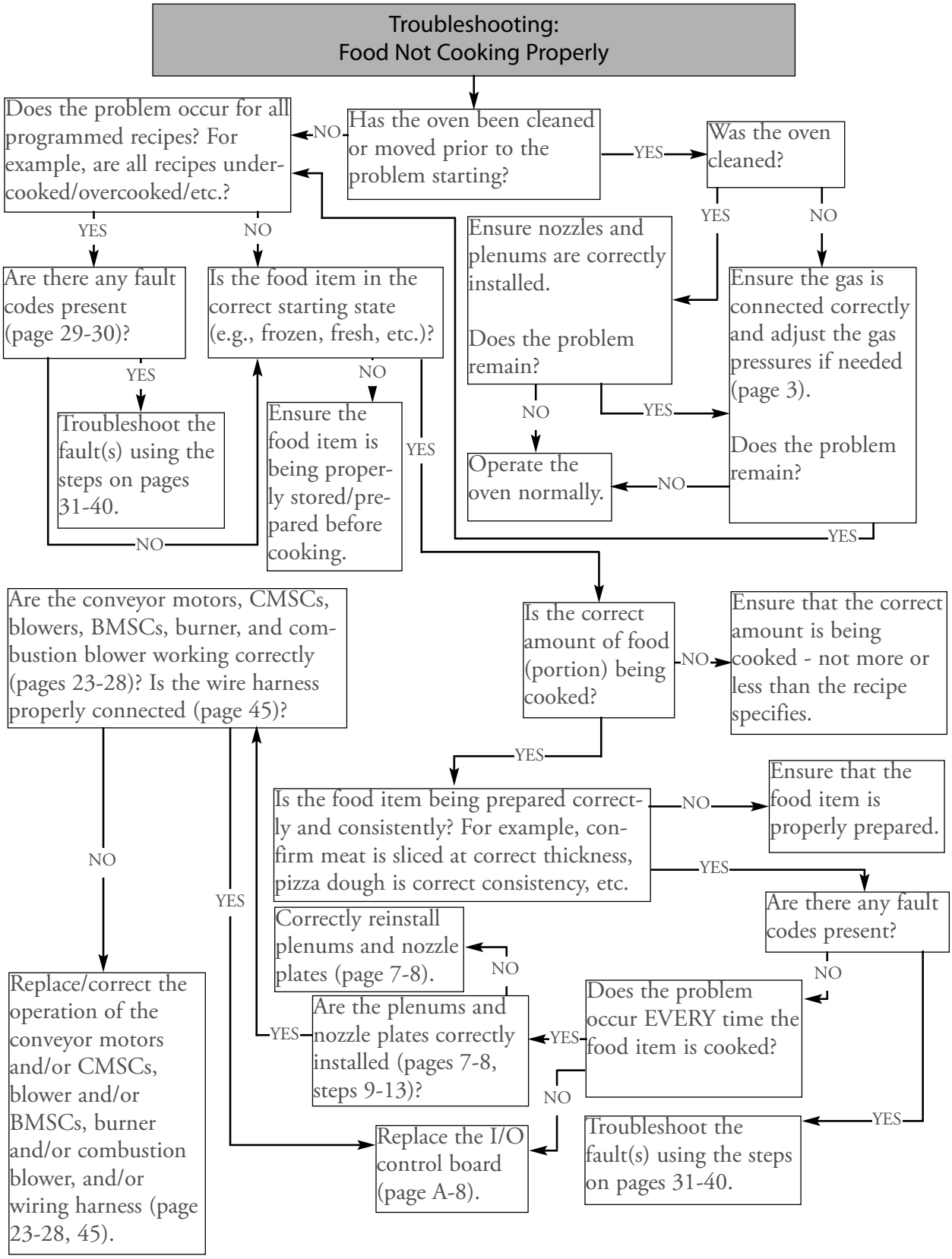
Figure 38: Motor Ohm Chart (Motor Windings, not Hall Effect Sensor)

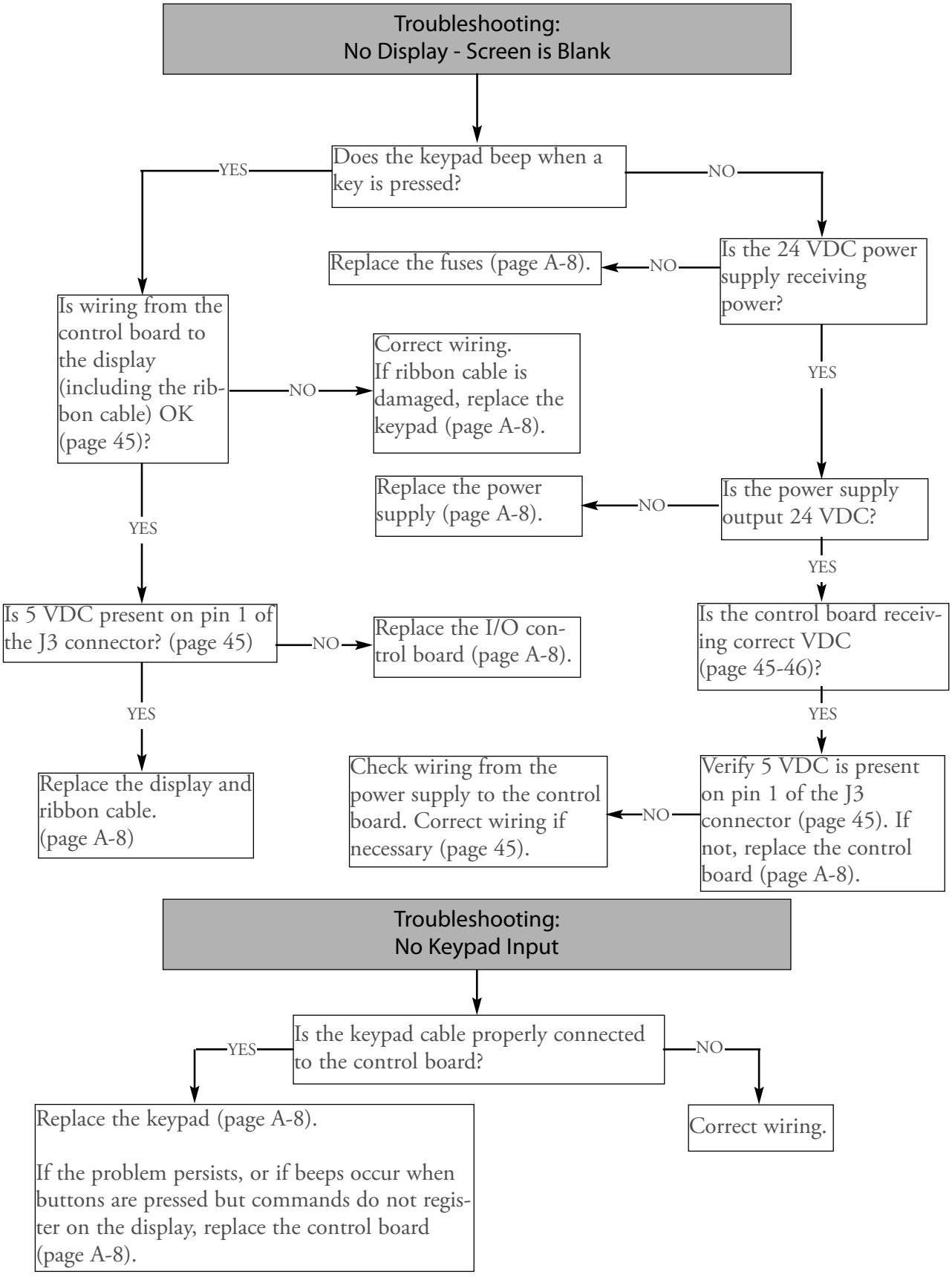

Troubleshooting:
F10: Air Pressure Switch Fault
Is the output of the burner transformer 24 VAC (page 28)?
YES
NO
Are all the contacts on the high limit thermostat closed?
Does the burner transformer have line voltage applied to input (208-240 VAC)?
NO
YES
Investigate the reason for the high limit tripping. If the thermostat is defective, replace it (page A-14).
Is the air pressure switch closed?
YES
Replace the burner transformer (page A-8).
NO
YES
Is the combustion blower running?
Is the wiring correct (page 45)?
YES
Replace the I/O control board (page A-8).
NO
Correct wiring (page 45).
NO
YES
Is line voltage applied (208-240 VAC) to the BMSC (page 25)?
Is the air tube connected tightly?
YES
NO
YES
NO
Replace the combustion blower (page A-14).
Replace the air switch (page A-14).
Replace the air tube.
NO
Check the wiring (page 45).
Replace the I/O control board (page A-8).
Is coil voltage (24 VDC) applied to the K3 relay (page 22)?
NO
Are the K3 relay contacts closed?
Replace the K3 relay (page A-8).
YES
YES
Check the wiring (page 45).

Non-Fault Code Troubleshooting

This section provides troubleshooting tips for issues that may occur independently of an oven fault.


Troubleshooting:
Cooling System Issue
Is the oven in an area of moderate temperature (120ºF [49ºC] or cooler)?
YES
NO
Relocate oven to cooler area.
Does the oven have room to ventilate (not tightly enclosed by other appliances or fixtures)?
NO
Move oven to open area or remove items that are in close proximity.
YES
Is the air filter dirty and/or the vent obstructed?
YES
Replace air filter and/or remove obstruction.
NO
Remove the cooling fan tube (page 1).
Is there an obstruction?
NO
Is the cooling fan thermostat closed (page 23)?
YES
Remove the obstruction.
NO
YES
Replace the cooling fan thermostat (page A-12).
Is line voltage applied (208-240 VAC) to the cooling fans?
NO
YES
Replace the cooling fans (page A-12).
Check the wiring for problems (page 45).


Troubleshooting:
Food Not Cooking Properly
Has the oven been cleaned or moved prior to the problem starting?
NO
YES
Was the oven cleaned?
YES
NO
Does the problem occur for all programmed recipes? For example, are all recipes under-cooked/overcooked/etc.?
YES
NO
Ensure nozzles and plenums are correctly installed.
Does the problem remain?
NO
YES
Ensure the gas is connected correctly and adjust the gas pressures if needed (page 3).
Does the problem remain?
NO
Operate the oven normally.
YES
Are there any fault codes present (page 29-30)?
YES
Troubleshoot the fault(s) using the steps on pages 31-40.
NO
Is the food item in the correct starting state (e.g., frozen, fresh, etc.)?
NO
Ensure the food item is being properly stored/prepared before cooking.
YES
Are the conveyor motors, CMSCs, blowers, BMSCs, burner, and combustion blower working correctly (pages 23-28)? Is the wire harness properly connected (page 45)?
Is the correct amount of food (portion) being cooked?
NO
Ensure that the correct amount is being cooked - not more or less than the recipe specifies.
YES
Is the food item being prepared correctly and consistently? For example, confirm meat is sliced at correct thickness, pizza dough is correct consistency, etc.
NO
Ensure that the food item is properly prepared.
YES
Are there any fault codes present?
NO
YES
Does the problem occur EVERY time the food item is cooked?
NO
YES
Troubleshoot the fault(s) using the steps on pages 31-40.
NO
Correctly reinstall plenums and nozzle plates (page 7-8).
YES
Are the plenums and nozzle plates correctly installed (pages 7-8, steps 9-13)?
YES
NO
Replace the I/O control board (page A-8).
Replace/correct the operation of the conveyor motors and/or CMSCs, blower and/or BMSCs, burner and/or combustion blower, and/or wiring harness (page 23-28, 45).


Troubleshooting:
No Display - Screen is Blank
Does the keypad beep when a key is pressed?
YES
NO
Is wiring from the control board to the display (including the ribbon cable) OK (page 45)?
NO
Correct wiring.
If ribbon cable is damaged, replace the keypad (page A-8).
YES
Is 5 VDC present on pin 1 of the J3 connector? (page 45)
NO
Replace the I/O control board (page A-8).
YES
Replace the display and ribbon cable.
(page A-8)
Replace the fuses (page A-8).
NO
Is the 24 VDC power supply receiving power?
YES
Replace the power supply (page A-8).
NO
Is the power supply output 24 VDC?
YES
Is the control board receiving correct VDC (page 45-46)?
YES
Check wiring from the power supply to the control board. Correct wiring if necessary (page 45).
NO
Verify 5 VDC is present on pin 1 of the J3 connector (page 45). If not, replace the control board (page A-8).
Troubleshooting:
No Keypad Input
Is the keypad cable properly connected to the control board?
YES
NO
Replace the keypad (page A-8).
If the problem persists, or if beeps occur when buttons are pressed but commands do not register on the display, replace the control board (page A-8).
Correct wiring.

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Schematics

DWG NO HHC–6620 SH 1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	PRODUCTION RELEASE	4/15/08	JKP
B	CORRECTIONS TO COMBUSTION FAN WIRING.	5/7/08	JKP

NOTES:

1: THE CONVEYOR AND COMBUSTION BLOWER DRIVES ARE IDENTICAL. THE ONLY DIFFERENCE IS THE PROGRAMMING. THE DRIVE, 103581, CAN BE PROGRAMMED TO MAKE ANY VERSION OF HHC-6630-1-2-3-4-5-6. REFERENCE PAGE 3 OF THE SCHEMATIC

2: COLOR CODE (LINE VOLTAGE)
BL - BLUE = LINE Vac (208/240) L2/N
BR - BROWN = LINE Vac (208/240) L1

3: COLOR CODE (LOW/CONTROL VOLTAGE)
BK - BLACK = 24 VDC COMMON
OR - ORANGE = STATUS INPUT
WH - WHITE = CONTROL OUTPUT
RD - RED = +24VDC

CONVEYOR MOTOR FRONT AND CONTROL

(HHC6630-2) 1

COMMANDER SL

(HHC-4120) (DUAL CONVEYOR)

RED
WHITE
YELLOW
GRAY
WHITE
BLACK

OPTIONAL SPLIT BELT WIRING

CONVEYOR MOTOR REAR AND CONTROL

(HHC6630-1 - SINGLE DRIVE)
(HHC6630-2 DUAL DRIVE) 1

COMMANDER SL

(HHC-6538) (SINGLE CONVEYOR)
(HHC-4120) (DUAL CONVEYOR)

RED
WHITE
YELLOW
GRAY
WHITE
BLACK

PRESSURE SWITCH 0.1 in H2O (102836)

GAS VALVE (102832)

PLUG, RECT (102833)

KEYPAD HHC-1234

SMART CARD CONNECTOR (100506)

(103023) CABLE, SMART CARD

A - ANALOG

B - ADV I/O

C - STD I/O

J2-DISPLAY

VFD DISPLAY 64 X 128 DOTS (100505)

IDLE SWITCH (102831)

COOLING FANS (100083)

OT 1 - 120°F (102086)

M/F AMP SPLICE

RTD (HHC-6517-1)

SPEAKER (104155)

(HHC-6501) 24VDC POWER SUPPLY

OT1 MANUAL RESET (102075)

IGNITION MODULE (103626-DOMESTIC)

ALARM
VALVE
VALVE
GROUND
25VAC
25V

K4 RELAY IGNITION (101275)

24VAC CONTROL XFRM (102837)

R (240)
B (208)
W (NOT USED)

HV
SENSE

BURNER/BLOWER ASSEMBLY
90 DEG BLOWER (HHC-6468)
INLINE BLOWER (HHC-6618)

FLAME SENSE (103624)

SPARK ROD (103623)

K3 GAS (101274)

COMBUSTION BLOWER
90 DEG BLOWER (103620)
INLINE BLOWER (103656)

ACTECH (103580)

L1 L2/N PE
MODE
U V W PE PE

RUN
SPD COMM (-1)
SPD CMD (+)

BLU - U
BRN - V
BLK - W
GRN - PE

TOP BLR (HHC-6520)

BTM BLR (HHC-6520)

F1: 20 AMPS CLASS CC (100599)
F2: 20 AMPS CLASS CC (100599)

EMI FILTER 15EHT1 (100542)

CHASSIS GROUND

DOMESTIC = NEMA L620

(HHC6630-3 - INLINE, 230V VERSION, NAT GAS) 1
(HHC6630-4 - 90DEG, 115V VERSION, NAT GAS)
(HHC6630-5 - INLINE, 230V VERSION, PROPANE GAS)
(HHC6630-6 - 90 DEG, 115V VERSION, PROPANE GAS)

TURBOCHEF TECHNICAL SUPPORT
800–908–8726

SIGNATURE	DATE
DRAWN	
CHECKED JKP	6/22/05
ENGINEER	
PRODUCTION	
QA	

TURBOCHEF

TITLE: SCHEMATIC, HHC-3240 OVEN
VFD DISPLAY, CSA APPROVED
SINGLE PHASE, 208/240 VAC, 60 HZ

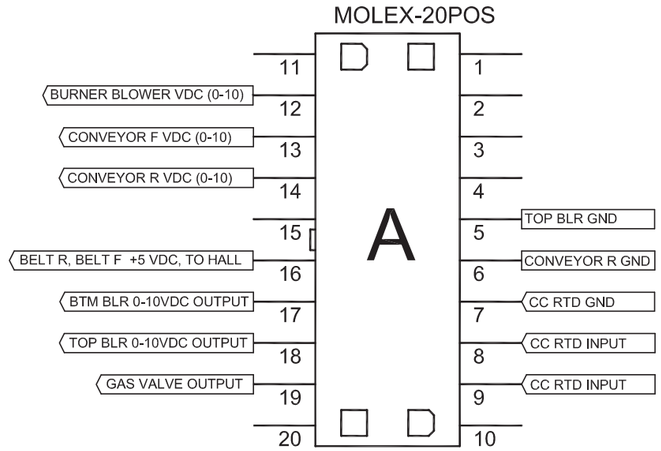
DASH NO	GENERAL	HHC
	NEXT ASSY	USED ON
APPLICATION		

SIZE D | CODE IDENT NO | DRAWING NO HHC–6620
SCALE NONE | KEY HHB81201 | SHEET 1 OF 1

NOTES:
RED - VDC OUTPUT (+)
WHITE - CONTROL OUTPUT
BLACK - GROUND (-)
ORANGE - STATUS INPUT

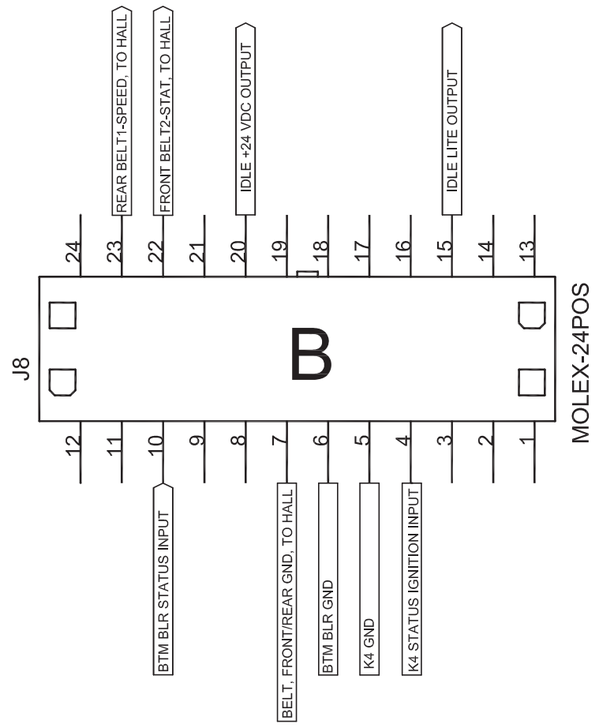
Analog I/0

MOLEX-20POS



J10

Mini-fit Jr. 39-28-8200



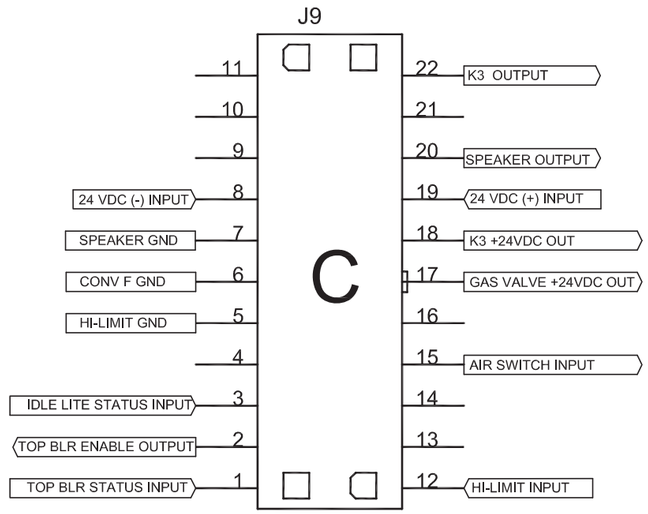
Advanced I/O

Mini-fit Jr. 39-28-8240

Standard I/O

Pins 8 and 19 are the
24V Power Supply input

J9



MOLEX-22POS

Mini-fit Jr 39-28-8220

Title: HHC-3240 I/O CONTROL PINOUTS		
Size	Number: HHC-6620	Rev: A
Date: APRIL 15, 2008		Drawn by: MJP/JKP
Filename		Sheet 2 of 3

Lenze / AC Tech SCM Drive (Single Phase)
For new different pole motors

Password: Stock 225 (Should change in Production)

Pram	Setting	Note
01	01 D	LineVoltage = High (01)
02	04	Carier Freq = ??? KHZ (04)
03	02	StartMethod = ??? (02)
04	01 D	StopMethod = Coast (01)
05	03	SpeedSource = 0-10VDC (03)
06	02	RelayOut = RUN (02)
10	02	TB13AFunction = ??? (02)
11	02	DB13BFunction = ??? (02)
12	01 D	TB13EFunction = None (01)
14	01 D	Control = TermStripOnly (01)
16	02 D	EditingUnits = WholeUnits (02)
17	01 D	Rotation = ForwardOnly (01)
19	100	AccelTime = 10.0 seconds
20	100	DecelTime = 10.0 seconds
21	00 D	DCBrakeTime = 0.0 seconds
22	00 D	DCBrakeVolt = 0.0 %
23	00 D	MinimumFreq = 0.0 Hz
24	450	MaximumFreq = 45.0 Hz
25	50	CurrentLimit = 50 %
26	100 D	MotorOverload = 100 %
27	600 D	BaseFreq = 60.0 Hz
28	10 D	FixedBoost = 1.0 %
29	00 D	AccelBoost = 0.0 %
30	00 D	SlipCompensation = 0.00 %
31	00 D	PresetSpeed 1 = 0.0 Hz
32	00 D	PresetSpeed 2 = 0.0 Hz
33	00 D	PresetSpeed 3 = 0.0 Hz
34	00 D	PresetSpeed 4 = 0.0 Hz
35	00 D	PresetSpeed 5 = 0.0 Hz
36	00 D	PresetSpeed 6 = 0.0 Hz
37	00 D	PresetSpeed 7 = 0.0 Hz
38	00 D	SkipBadwidth = 0.0 Hz
39	00 D	SpeedScalling = 0.0
42	200 D	AccelDecel #2 = 20.0 seconds
44	225 D	Password
45	00 D	SpeedAtMinSignal = 0.0 Hz
46	450	SpeedAtMaxSignal = 45.0 Hz
47	01 D	ClearHistory = Maintain (01)
48	01 D	ProgramSelector = User (01)

|___ D in this collum means factory default settings

The rest are read only:
50 Fault History
51 Software Code
52 DC Bus Voltage
53 Motor Voltage
54 Load
55 0-10VDC input
56 4-20mA input
57 TB Strip Status
58 Keypad Status

Control Techniques: Commander SL (EMERSON)

Conveyor Motor - BGFM15-240TD2NX (LARGE FRAME)
Single Conveyor Only (-1 VERSON)

Password: "0" (Stock password, should change in Production)

Pram	Setting	Note
01	0.0	Minimum set speed in Hz
02	120	Maximum set speed in Hz
03	0.0	Accelleration rate (in sec/100Hz)
04	0.0	Decelleration rate (in sec/100Hz)
05	AV	Drive confguration
06	0.17	Motor rated current
07	1550	Motor rated speed (Note: RPM of motor - not output)
08	208	Motor rated voltage
09	0.73	Motor power factor
10	OPEn	Parameter access
11	0	Start/Stop logic
15	0.0	Jog referance
17	OFF	Enable negative prreset speeds
18	0.0	Preset Speed 1
19	0.0	Preset Speed 2
20	0.0	Preset Speed 3
21	0.0	Preset Speed 4
25	0	Securty Setup
27	0	Power up keypad referance
29	no	Load defaults
30	1	Ramp mode select
31	2	Stopping mode select
32	OFF	Dynamic V to f select
33	2	Catch a spinning motor select
35	n=0	Terminal T4 output mode select
37	3	Maximum switching freq (in kHz)
39	60.0	Motor rated frequency
40	Auto	Number of motor poles
41	Fd	Voltage mode select
42	3.0	Low frequency voltage boost

The rest are read only

Commander SL (EMERSON) -- PROGRAM FOR (-2 VERSION)
Conveyor Motor - BGFM12-240TC2NX (SMALL FRAME)

06	0.15	Motor rated current
07	1610	Motor rated speed (RPM of motor, not gearbox)
09	0.63	Motor power factor

ALL OTHER PARAMETERS PER -1 VERSION

Control Techniques: Commander SL (EMERSON)

Burner Blower, In-line, 230VAC, NATURAL GAS (-3 VERSION)

Password: "0" (Stock password, should change in Production)

Pram	Setting	Note
01	0.0	Minimum set speed in Hz
02	69.0	Maximum set speed in Hz
03	0.0	Accelleration rate (in sec/100Hz)
04	0.0	Decelleration rate (in sec/100Hz)
05	AV	Drive confguration
06	0.30	Motor rated current
07	3200	Motor rated speed
08	208	Motor rated voltage
09	0.80	Motor power factor
10	OPEn	Parameter access
11	0	Start/Stop logic
15	0.0	Jog referance
17	OFF	Enable negative prreset speeds
18	0.0	Preset Speed 1
19	0.0	Preset Speed 2
20	0.0	Preset Speed 3
21	0.0	Preset Speed 4
25	0	Securty Setup
27	0	Power up keypad referance
29	no	Load defaults
30	1	Ramp mode select
31	2	Stopping mode select
32	OFF	Dynamic V to f select
33	2	Catch a spinning motor select
35	n=0	Terminal T4 output mode select
37	3	Maximum switching freq (in kHz)
39	60.0	Motor rated frequency
40	Auto	Number of motor poles
41	Fd	Voltage mode select
42	3.0	Low frequency voltage boost

The rest are read only

Commander SL (EMERSON) PROGRAM FOR (-4 VERSION)
BLOWER, COMBUSTION, 90DEG, 115VAC, NATURAL GAS

06	0.5	Motor rated current
08	115	Motor rated voltage

ALL OTHER PARAMETERS PER -3 VERSION

Control Techniques: Commander SL (EMERSON)

Burner Blower, In-line, 230VAC, PROPANE (-5 VERSION)

Password: "0" (Stock password, should change in Production)

Pram	Setting	Note
01	20.0	Minimum set speed in Hz
02	69.0	Maximum set speed in Hz
03	0.0	Accelleration rate (in sec/100Hz)
04	0.0	Decelleration rate (in sec/100Hz)
05	AV	Drive confguration
06	0.30	Motor rated current
07	3200	Motor rated speed
08	208	Motor rated voltage
09	0.80	Motor power factor
10	OPEn	Parameter access
11	0	Start/Stop logic
15	0.0	Jog referance
17	OFF	Enable negative prreset speeds
18	0.0	Preset Speed 1
19	0.0	Preset Speed 2
20	0.0	Preset Speed 3
21	0.0	Preset Speed 4
25	0	Securty Setup
27	0	Power up keypad referance
29	no	Load defaults
30	1	Ramp mode select
31	2	Stopping mode select
32	OFF	Dynamic V to f select
33	2	Catch a spinning motor select
35	n=0	Terminal T4 output mode select
37	3	Maximum switching freq (in kHz)
39	60.0	Motor rated frequency
40	Auto	Number of motor poles
41	Fd	Voltage mode select
42	3.0	Low frequency voltage boost

The rest are read only

Commander SL (EMERSON) PROGRAM FOR (-6 VERSION)
BLOWER, COMBUSTION, 90DEG, 115VAC, PROPANE

01	20.0	Minimum set speed in Hz
06	0.5	Motor rated current
08	115	Motor rated voltage

ALL OTHER PARAMETERS PER -3 VERSION

Title	HHC-3240, VFD SETTINGS, EMERSON, ACTECH
Size	
Number	HHC-6620
Rev	A
Date	APRIL 15, 2008
Drawn by	
Filename	
Sheet	3 of 3

Appendix A - Replacing Oven Components

Replacing Oven Components

⚠ WARNING: Before removing or replacing any oven component, thoroughly read the safety instructions found at the front of this manual and *Oven Systems* (pages 21-28). Adhere to all precautions and warnings outlined in these sections, as failure to do so could result in serious injury or death.

To Replace This...		First Open or Remove This...			
Item	Part Number	No Panel Removal Required (Page A-6)	Right End Bell (Page A-8)	Left End Bell (Page A-12)	Back Panel (Page A-14)
Air Pressure Switch	102836				✔
Blower Motor, Lower	HHC-6520		✔		
Blower Motor, Upper	HHC-6520			✔	
Blower Motor Controller (BMSC), Lower	103580		✔		
Blower Motor Controller (BMSC), Upper	103580			✔	
Blower Wheel, Lower	103567		✔		
Blower Wheel, Upper	103567			✔	
Bolt Retainer Bracket	HHC-6426		✔		
Bracket, CMSC	HHC-6606			✔	
Bracket, Dual Fan Mounting	HHC-6371			✔	
Bracket, EMI Filter	HHC-6342		✔		
Bracket, Gear Drive Controller	HHC-6465		✔		
Bracket, Thermostat	HHC-6390				✔
Burner Assembly	HHC-6468				✔
Cable, Display, Power, 2-Pin	100193		✔		
Cable, Display, Ribbon	100184		✔		
Cable, Smart Card Reader	103023		✔		
Caster	102799	✔			
Catch, Slotted Eyebrow	HHC-6499	✔			
Chain Guard	HHC-6411	✔			
Chin Assembly, Left End	HHC-6464	✔			
Chin Assembly, Right End	HHC-6463	✔			
Clamp, Conduit, 1/2 Nominal, Zinc	103632				✔
Collar, 5/8-inch Shaft	100257		✔		
Combustion Motor (90°)	103620				✔
Combustion Motor (Inline)	103656				✔
Combustion Motor Controller (90°, Nat Gas)	HHC-6630-3			✔	
Combustion Motor Controller (Inline, Nat Gas)	HHC-6630-4			✔	
Combustion Motor Controller (90°, Propane)	HHC-6630-5			✔	
Combustion Motor Controller (Inline, Propane)	HHC-6630-6			✔	
Control Board	CON-7002		✔		
Conveyor Belt Kit, Single, Left to Right	HHC-6561-1	✔			
Conveyor Belt Kit, Single, Right to Left	HHC-6561-2	✔			
Conveyor Belt Kit, 50/50 Split, Left to Right	HHC-6661-1	✔			
Conveyor Belt Kit, 50/50 Split, Right to Left	HHC-6661-2	✔			
Conveyor Belt Kit, 70/30 Split, Left to Right	HHC-6662-1	✔			

To Replace This...		First Open or Remove This...			
Item	Part Number	No Panel Removal Required (Page A-6)	Right End Bell (Page A-8)	Left End Bell (Page A-12)	Back Panel (Page A-14)
Conveyor Belt Kit, 70/30 Split, Right to Left	HHC-6662-2	✔			
Cord, Power, 12/3, SOOW, NEMA L620	HHC-6311-1		✔		
Cover, Blower Insulation, Lower	HHC-6367		✔		
Cover, Blower Insulation, Upper	HHC-6367			✔	
Cover, Burner Compartment	HHC-6137	✔			
Cover, Left End Bell	HHC-6529	✔			
Cover, Right End Bell	HHC-6528	✔			
Display	100505		✔		
EMI Filter	100542		✔		
Fan, Cooling, Lower	100083			✔	
Fan, Cooling, Upper	100083			✔	
Filter, Air, Front, 11.75" x 7.5"	HHC-6017	✔			
Filter, Air, Rear, 9" x 3.25"	HHC-6343	✔			
Flame Sensor	103624				✔
Flame Sensor Wire	103575				✔
Flame Spreader	See Burner Assembly				✔
Fuse	100599		✔		
Fuse Block	103548		✔		
Gas Pipe, 8" (Between Stacked Ovens Only)	103572	✔			
Gas Pipe, 10" (Single or Lower Oven Only)	103576	✔			
Gas Valve, Modulating	102832				✔
Gear Drive, Dual Belt	HHC-4120		✔		
Gear Drive, Single Belt	HHC-6538		✔		
Gear Drive Controller (Dual Drive)	HHC-6630-2		✔		
Gear Drive Controller (Single Drive)	HHC-6630-1		✔		
Geared Hub	HHC-6607		✔		
Handle, Window	HHC-6632	✔			
Heat Slinger, Blower, Lower	102708		✔		
Heat Slinger, Blower, Upper	102708			✔	
Ignition Module	103626				✔
Keypad	HHC-1234	✔			
Label, Caster Notice	HHC-6610	✔			
Label, Caution, Hot Surface	NGC-1137	✔			
Label, Cleaning Cautions	HHC-6653	✔			
Label, Filter	I5-9372	✔			
Label, Gas-Fired cULus	HHC-6649	✔			
Label, Notice	HHC-6611	✔			
Label, Operating Instructions	HHC-6612	✔			
Label, Servicing Cautions	HHC-6655	✔			
Label, TurboService Number	NGC-1170	✔			
Label, UL NSF	NGC-1171	✔			
Leg Kit, 14-Inch	HHC-6850-14	✔			

To Replace This...		First Open or Remove This...			
Item	Part Number	No Panel Removal Required (Page A-6)	Right End Bell (Page A-8)	Left End Bell (Page A-12)	Back Panel (Page A-14)
Leg Kit, 20-Inch	HHC-6850-20	✔			
Leg Kit, 26-Inch	HHC-6850-26	✔			
Literature Packet	HHC-6654	✔			
Manometer Kit, Electronic with Nylon Case	HHC-3001	✔			
Menu, HhC3240	Call Customer Service	✔			
Nutplate, Drive Bracket	HHC-6396		✔		
Panel , Conveyor Drive	HHC-6462		✔		
Pipe and Valve Assembly	HHC-6513				✔
Plate, Conveyor Drive, Double	HHC-6467		✔		
Plate, Blower Motor, Lower	HHC-6405		✔		
Plate, Blower Motor, Upper	HHC-6405			✔	
Plate, Blower Mounting, Lower	HHC-6404		✔		
Plate, Blower Mounting, Upper	HHC-6404			✔	
Plenum, Lower	HHC-6565-2	✔			
Plenum, Upper	HHC-6565-1	✔			
Power Supply, Domestic	HHC-6501		✔		
Power Supply, International	101211		✔		
Relay, K3, 24 VDC, 20A	101274		✔		
Relay, K4, Sealed, 24 VAC, 20A	101275				✔
RTD Probe	HHC-6517		✔		
Shield, Gas Pipe	HHC-6613				✔
Shutter, Inlet Air Blower	HHC-6617				✔
Smart Card Reader	100506		✔		
Spark Assembly	103623				✔
Spark Assembly Wire	103574				✔
Speaker	104155		✔		
Sprocket, 1" Bore	101906		✔		
Spur Gear, 2.75 PD, 1/2-inch Bore	101895		✔		
Spur Gear, 3.5 PD, 5/8-inch Bore	101903		✔		
Switch, Momentary, Mushroom (Idle Button)	102831			✔	
Thermostat, 120F, Close on Rise	102086			✔	
Thermostat, High Limit	102075				✔
Top, Outer Curved	HHC-6482	✔			
Transformer, Burner	102837		✔		
Tube, Cooling Fan	HHC-6374	✔			
Tube, Flexible, Gas, 1/2-Inch	103628				✔
Tube, Flexible, Gas, 1/2-Inch, with LP Orifice	103633				✔
Weldment, Bracket, Single Drive	HHC-6557		✔		
Weldment, Bracket, Split Belt	HHC-6309		✔		

To Replace This...		First Open or Remove This...			
Item	Part Number	No Panel Removal Required (Page A-6)	Right End Bell (Page A-8)	Left End Bell (Page A-12)	Back Panel (Page A-14)
Weldment, Shaft, Internal Drive	HHC-6306		✔		
Window Kit	HHC-3003	✔			
Wire Harness, Conveyor Drive AC	HHC-6598-4		✔		
Wire Harness, Cooling Fan	HHC-6598-2			✔	
Wire Harness, HV, Main	HHC-6598-1		✔	✔	✔
Wire Harness, K3 Relay and Transformer	HHC-6598-3		✔		
Wire Harness, LOV, Air Switch, 25V	HHC-6599-3			✔	
Wire Harness, LOV, High Limit, 25V	HHC-6599-6				✔
Wire Harness, LOV, Ignition Alarm	HHC-6599-2		✔		
Wire Harness, LOV, K4 Ground	HHC-6599-4				✔
Wire Harness, LOV, Main	HHC-6599-1		✔	✔	✔
Wire Harness, LOV, Signal, Gear Drive	HHC-6599-5		✔		

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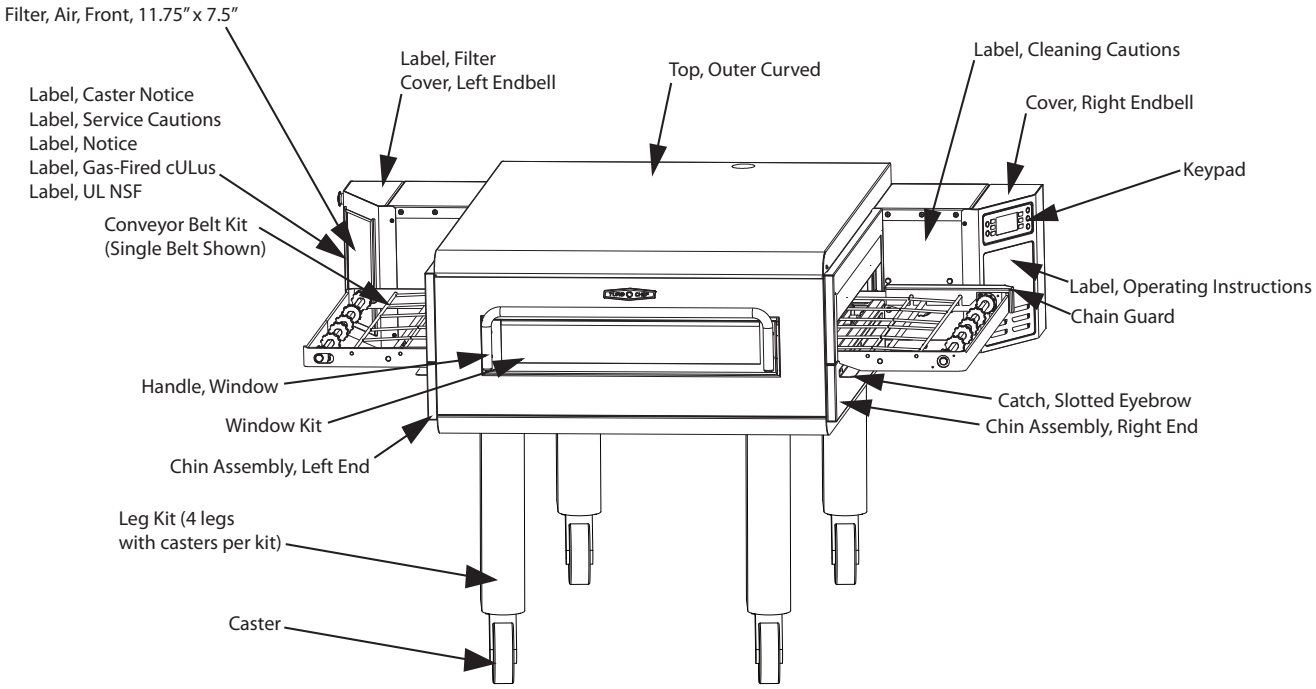
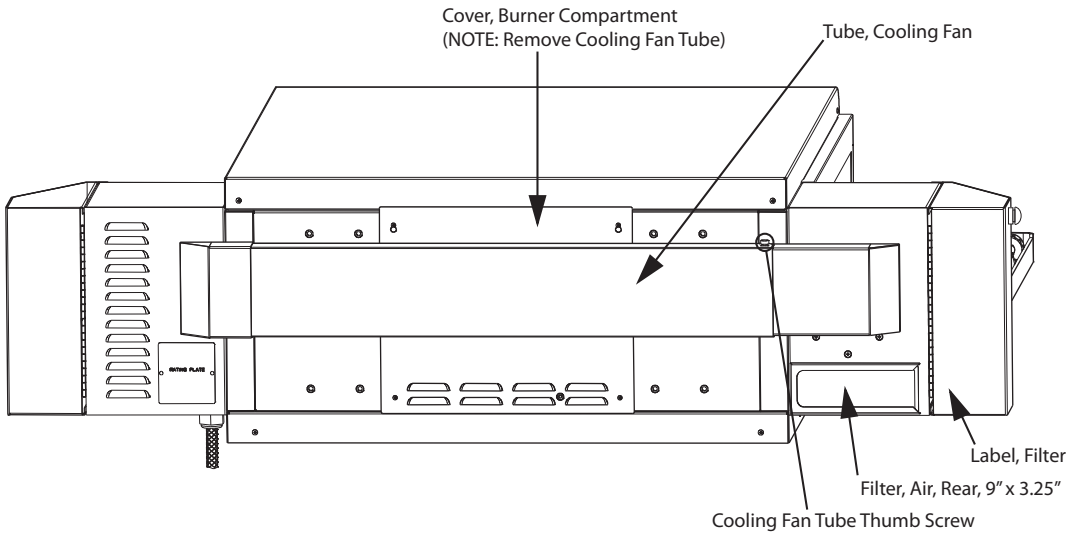
Replacing Items - No Panel Removal Required

⚠ WARNING: Before removing or replacing any oven component, thoroughly read the safety instructions found at the front of this manual and *Oven Systems* (pages 21-28). Adhere to all precautions and warnings outlined in these sections, as failure to do so could result in serious injury or death.

⚠ CAUTION: Before removing/installing any component, make sure it is disconnected from the wire harness (where applicable).



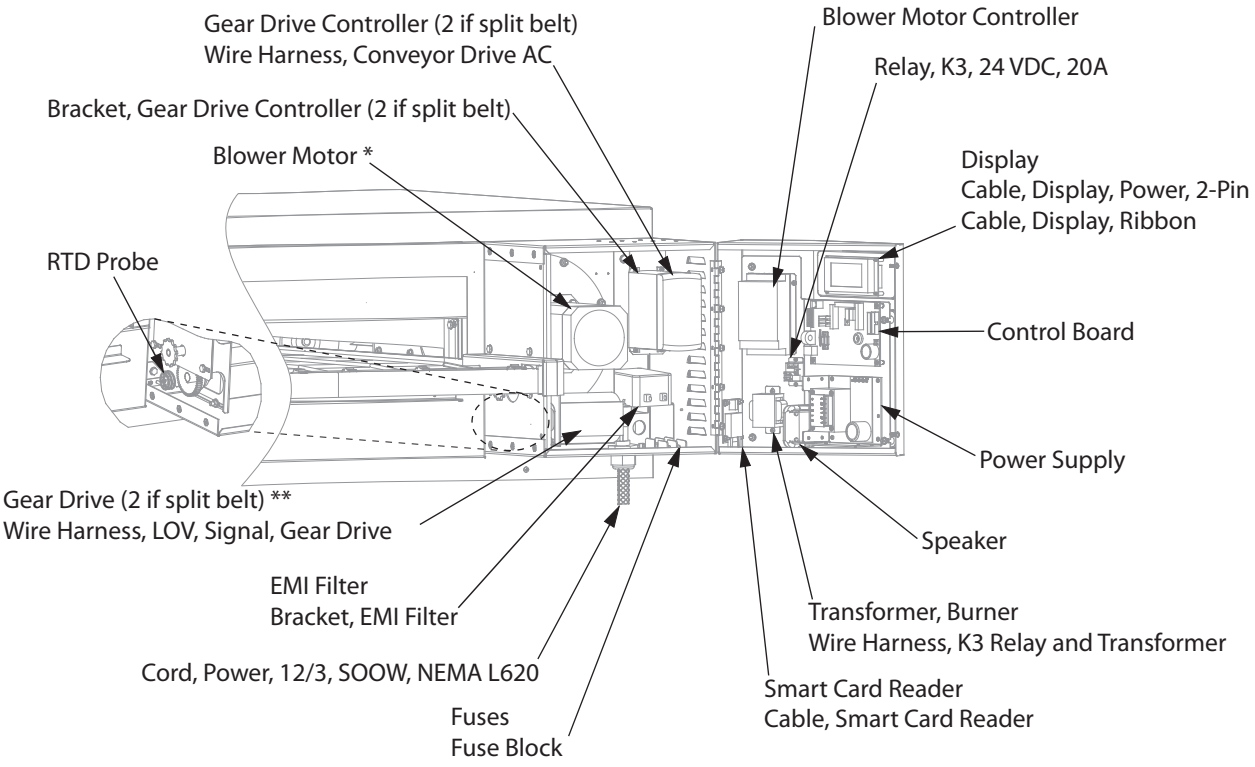

Cover, Burner Compartment
(NOTE: Remove Cooling Fan Tube)
Tube, Cooling Fan
Label, Filter
Filter, Air, Rear, 9" x 3.25"
Cooling Fan Tube Thumb Screw

Item	Part Number	Hardware Description	Hardware Part Number(s)
Caster	102799	Use lifters - see Installation Manual for instructions.	None
Catch, Slotted Eyebrow	HHC-6499	Screw, Sheet Metal, #8 x 1/2 Serrated PHTRH	101688 (x3)
Chain Guard	HHC-6411	None	N/A
Chin Assembly, Left End	HHC-6464	None	N/A
Chin Assembly, Right End	HHC-6463	None	N/A
Conveyor Belt Kit, Single, Left to Right	HHC-6561-1	None	N/A
Conveyor Belt Kit, Single, Right to Left	HHC-6561-2	None	N/A
Conveyor Belt Kit, 50/50 Split, Left to Right	HHC-6661-1	None	N/A
Conveyor Belt Kit, 50/50 Split, Right to Left	HHC-6661-2	None	N/A
Conveyor Belt Kit, 70/30 Split, Left to Right	HHC-6662-1	None	N/A
Conveyor Belt Kit, 70/30 Split, Right to Left	HHC-6662-2	None	N/A
Cover, Burner Compartment	HHC-6137	Screw, Sh Mtl, #8 x 3/8 PPHD, Type A, SS	101696 (x4)
Cover, Left End Bell	HHC-6529	Screw, #10-32 x 1/2", PPHD, SS	101460 (x2)
Cover, Right End Bell	HHC-6528	Screw, #10-32 x 1/2", PPHD, SS	101460 (x2)
Filter, Air, Front, 11.75" x 7.5"	HHC-6017	None	N/A
Filter, Air, Rear, 9" x 3.25"	HHC-6343	None	N/A
Gas Pipe, 8" (Between Stacked Ovens Only)	103572	None	N/A
Gas Pipe, 10" (Single or Lower Oven Only)	103576	None	N/A
Handle, Window	HHC-6632	Screw, 3/4 LP RHD, 1/4-20 x 1.00 Lg, SS	101738 (x4)
Keypad	HHC-1234	None	N/A
Label, Caster Notice	HHC-6610	None	N/A
Label, Caution, Hot Surface	NGC-1137	None	N/A
Label, Cleaning Cautions	HHC-6653	None	N/A
Label, Filter	I5-9372	None	N/A
Label, Gas-Fired cULus	HHC-6649	None	N/A
Label, Notice	HHC-6611	None	N/A
Label, Operating Instructions	HHC-6612	None	N/A
Label, Servicing Cautions	HHC-6655	None	N/A
Label, TurboService Number	NGC-1170	None	N/A
Label, UL NSF	NGC-1171	None	N/A
Leg Kit, 14-Inch	HHC-6850-14	Included	Included
Leg Kit, 20-Inch	HHC-6850-20	Included	Included
Leg Kit, 26-Inch	HHC-6850-26	Included	Included
Literature Packet	HHC-6654	None	N/A
Manometer Kit, Electronic with Nylon Case	HHC-3001	None	N/A
Plenum, Lower (not pictured)	HHC-6565-2	None	N/A
Plenum, Upper (not pictured)	HHC-6565-1	None	N/A
Top, Outer Curved	HHC-6482	Screw, Sheet Metal, #8 x 1/2 Serrated PHTRH	101688 (x4)
Tube, Cooling Fan	HHC-6374	Screw, Thumb, , w/ WHD, #1/4-20 x 1/2", SS	101752
Window Kit	HHC-3003	Included	N/A

Replacing Items - Right End Bell

⚠ WARNING: Before removing or replacing any oven component, thoroughly read the safety instructions found at the front of this manual and *Oven Systems* (pages 21-28). Adhere to all precautions and warnings outlined in these sections, as failure to do so could result in serious injury or death.

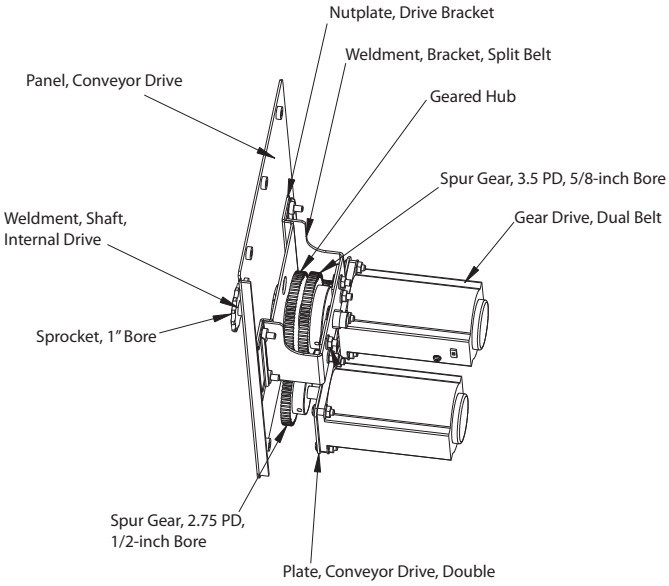
⚠ CAUTION: Before removing/installing any component, make sure it is disconnected from the wire harness (where applicable).

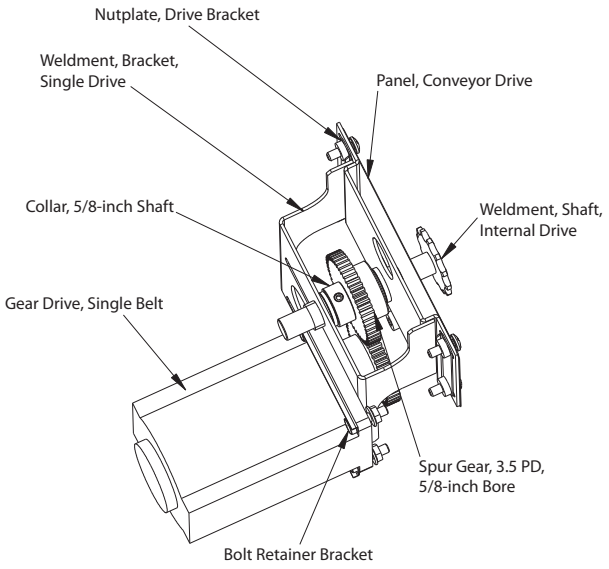


* NOTE: For blower motor detail, see page A-12.
**NOTE: For gear drive detail, see page A-10.

Item	Part Number	Hardware Description	Hardware Part Number(s)
Blower Motor, Lower	HHC-6520	Key, 3/16 Shim, Shaft Seal Sealing Block, Blower Washer, Wave Spring Clamp, Blower Seal Nut, 1/4-20, Serrated Hex Flange, Plated Steel	100731 (to wheel) 700-0284 (to wheel) NGC-1024 (to wheel) 102436 (to wheel) NGC-1023 (to wheel) 100906 (x8 - to oven)
Blower Motor Controller (BMSC), Lower	103580	Nut, #6-32, Serrated Hex Flange, SS	100902 (x4)
Blower Wheel, Lower	103567	See "Blower Motor" hardware	See "Blower Motor"
Bracket, EMI Filter	HHC-6342	Nut, #10-32, Serrated Hex Flange, SS	100903 (x4)
Bracket, Gear Drive Controller	HHC-6465	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS Nut, #10-32, Serrated Hex Flange, SS	101696 (x4) 100903 (x4)
Cable, Display, Power, 2-Pin	100193	None	N/A
Cable, Display, Ribbon	100184	None	N/A
Cable, Smart Card Reader	103023	None	N/A
Control Board	CON-7002	Screw, #6-32 x 3/8, Int Tooth, PPHD, SS	102911 (x4)
Cord, Power, 12/3, SOOW, NEMA L620	HHC-6311-1	None	N/A
Cover, Blower Insulation, Lower	HHC-6367	See "Blower Motor" hardware	See "Blower Motor"
Display	100505	Nut, 4-40 Hex, Nylock, SS Standoff, Rd, .12 ID, .25 OD x .50 Lg	101060 (x4) 101954 (x4)
EMI Filter	100542	Nut, #6-32, Hex, SS	100990 (x4)
Fuse	100599	None	N/A
Fuse Block	103548	Nut, #10-32, Serrated Hex Flange, SS	100903 (x2)
Gear Drive, Dual Belt	HHC-4120	None	N/A
Gear Drive, Single Belt	HHC-6538	None	N/A
Gear Drive Controller (Dual Drive)	HHC-6630-2	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS Nut, #10-32, Serrated Hex Flange, SS	101696 (x4) 100903 (x4)
Gear Drive Controller (Single Drive)	HHC-6630-1	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS Nut, #10-32, Serrated Hex Flange, SS	101696 (x4) 100903 (x4)
Heat Slinger, Blower, Lower	102708	See "Blower Motor" hardware	See "Blower Motor"
Plate, Blower Motor, Lower	HHC-6405	Screw, 1/4-20 x .50, Hex Serrated Washer Head, SS Spacer, Blower Motor	101394 (x4) NGC-1022 (x4)
Plate Weldment, Blower Mounting, Lower	HHC-6404	Screw, 1/4-20 x .50, Hex Serrated Washer Head, SS Spacer, Blower Insulation Cover	101394 (x4) HHC-6366 (x4)
Power Supply, Domestic	HHC-6501	Screw, 6-32 x 3/8, Sht Mtl Drill Point, PPHD, Zinc	101684 (x4)
Power Supply, International	101211	Screw, 6-32 x 3/8, Sht Mtl Drill Point, PPHD, Zinc	101684 (x4)
Relay, K3, 24 VDC, 20A	101274	Screw, 6-32 x 3/8, Sht Mtl Drill Point, PPHD, Zinc	101684 (x2)
RTD Probe	HHC-6517	Screw, 6-32 x 3/8, Sht Mtl Drill Point, PPHD, Zinc	101684 (x2)
Smart Card Reader	100506	Washer, #6 Flat, Cres Spacer, Round, .192 ID x .25 OD x .125 LG, SS	102170 (x4) 101885 (x4)
Speaker	104155	Screw, 6-32 x 3/8, Sht Mtl Drill Point, PPHD, Zinc	101684 (x2)
Transformer, Burner	102837	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS	101696 (x2)
Wire Harness, Conveyor Drive AC	HHC-6598-4	None	N/A
Wire Harness, K3 Relay and Transformer	HHC-6598-3	None	N/A
Wire Harness, LOV, Signal, Gear Drive	HHC-6599-5	None	N/A

Gear Drive Assembly Detail



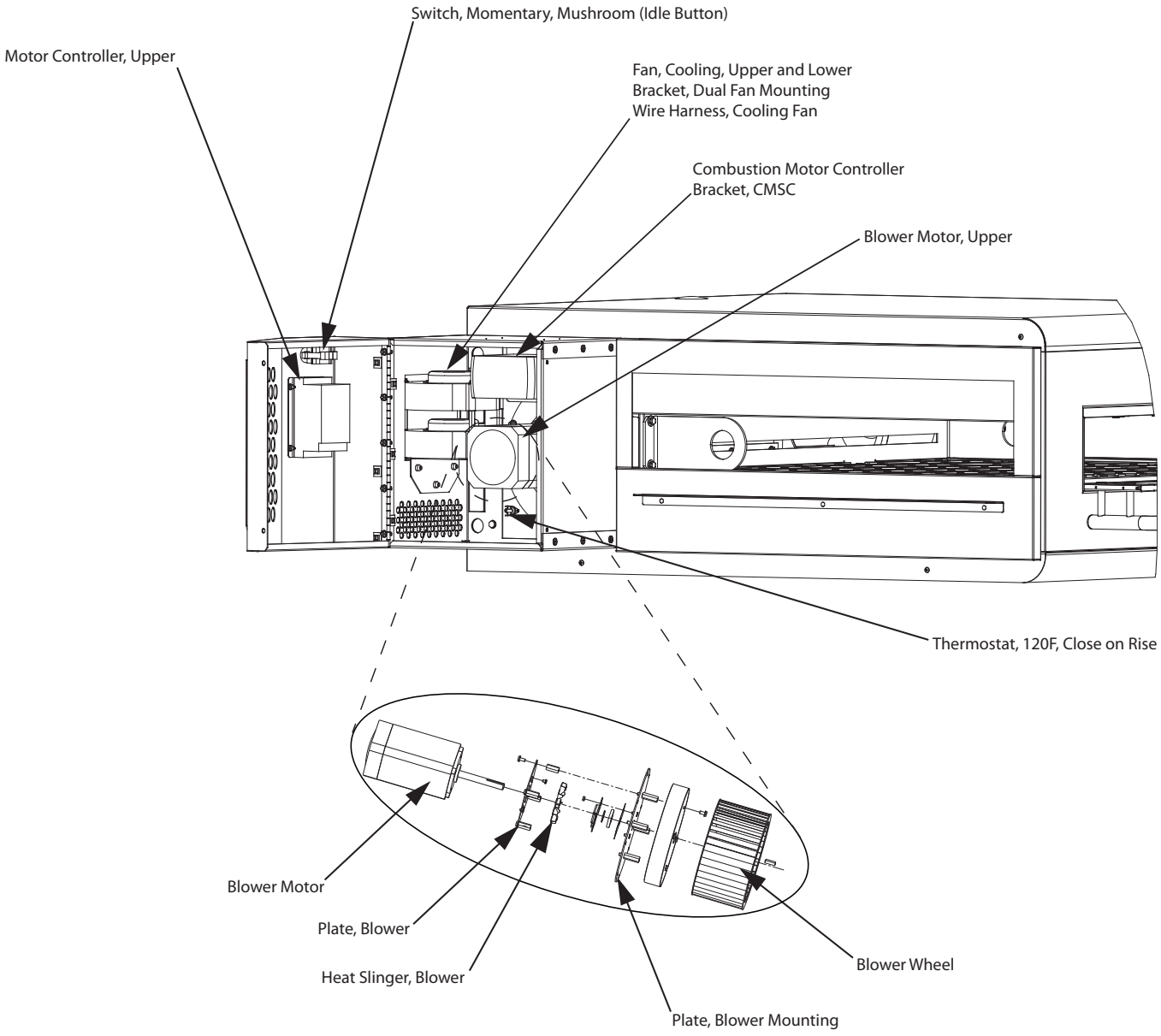


Item	Part Number	Hardware Description	Hardware Part Number(s)
Bolt Retainer Bracket	HHC-6426	None	N/A
Collar, 5/8-inch Shaft	100257	None	N/A
Gear Drive, Dual Belt	HHC-4120	Washer, Thrust, 5/8" ID x 1/16 THK Screw, 1/4-20 x 3/4 Lg, PHTRHD, SS Nut, 1/4-20, Serrated Hex Flange, Plated Steel	103470 (x1 each) 101399 (x4 each) 100906 (x4 each)
Gear Drive, Single Belt	HHC-6538	Nut, 1/4-20, Serrated Hex Flange, Plated Steel Screw, 1/4-20 x 3/4 Lg, PHTRHD, SS Washer, Thrust, 5/8" ID x 1/16 THK	100906 (x4) 101399 (x4) 103470
Geared Hub	HHC-6607	Washer, Thrust, 5/8" ID x 1/8 THK Washer, Thrust, 1" ID x 1/16 THK	103471 103472
Nutplate, Drive Bracket	HHC-6396	None	N/A
Panel , Conveyor Drive	HHC-6301	Nut, 1/4-20, Serrated Hex Flange, Plated Steel Screw, 1/4-20 x 3/4 Lg, PHTRHD, SS	100906 (x4) 101399 (x4)
Plate, Conveyor Drive, Double	HHC-6467	None	N/A
Sprocket, 1" Bore	101906	None	N/A
Spur Gear, 2.75 PD, 1/2-inch Bore	101895	None	N/A
Spur Gear, 3.5 PD, 5/8-inch Bore	101903	Screw, Set, SKT, CUP PAWL, 1/4-20 x 1/2 Lg	101719 (x1 each)
Weldment, Bracket, Single Drive	HHC-6557	None	N/A
Weldment, Bracket, Split Belt	HHC-6309	None	N/A
Weldment, Shaft, Internal Drive	HHC-6306	Washer, Thrust, 5/8" ID x 1/8 THK	103471

Replacing Items - Left End Bell

⚠ WARNING: Before removing or replacing any oven component, thoroughly read the safety instructions found at the front of this manual and *Oven Systems* (pages 21-28). Adhere to all precautions and warnings outlined in these sections, as failure to do so could result in serious injury or death.

⚠ CAUTION: Before removing/installing any component, make sure it is disconnected from the wire harness (where applicable).



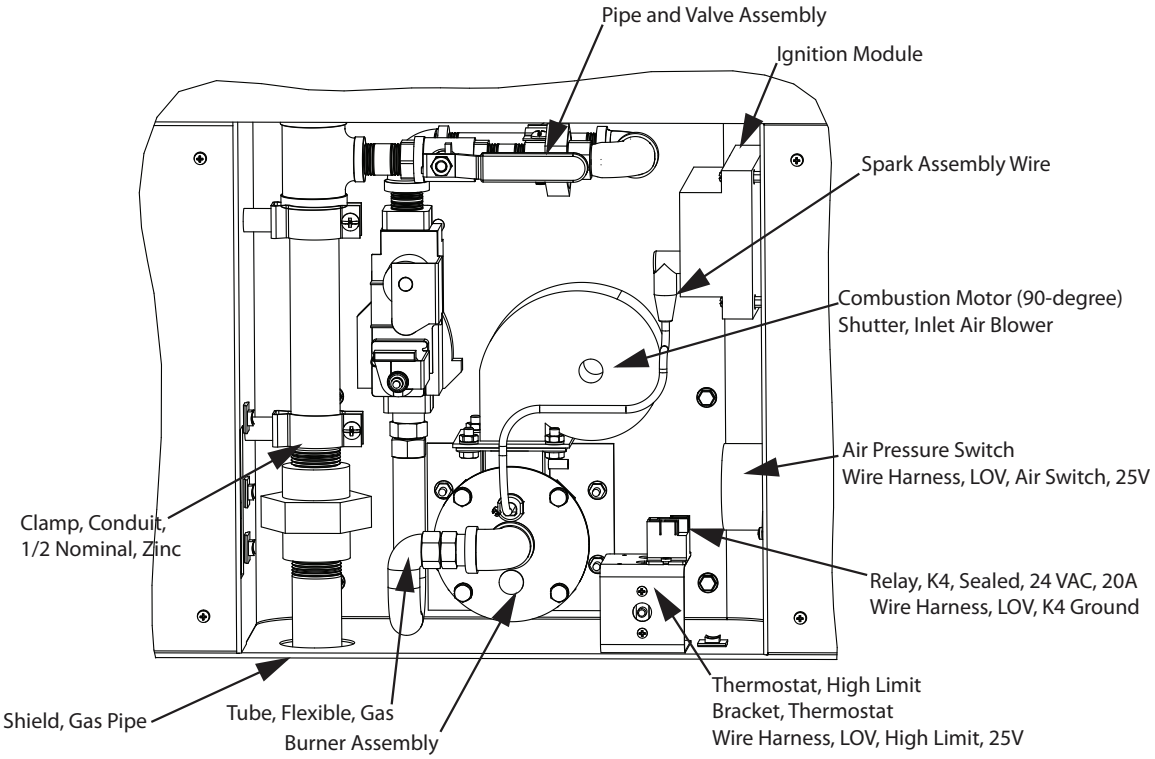
Item	Part Number	Hardware Description	Hardware Part Number(s)
Blower Motor, Upper	HHC-6520	Key, 3/16 Shim, Shaft Seal Sealing Block, Blower Washer, Wave Spring Clamp, Blower Seal Nut, 1/4-20, Serrated Hex Flange, Plated Steel	100731 (to wheel) 700-0284 (to wheel) NGC-1024 (to wheel) 102436 (to wheel) NGC-1023 (to wheel) 100906 (x8 - to oven)
Blower Motor Controller (BMSC), Upper	103580	Nut, #6-32, Serrated Hex Flange, SS	100902 (x4)
Blower Wheel, Upper	103567	See "Blower Motor" hardware	See "Blower Motor"
Bracket, CMSC	HHC-6606	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS Nut, #10-32, Serrated Hex Flange, SS	101696 (x4) 100903 (x4)
Bracket, Dual Fan Mounting	HHC-6371	Screw, 1/4-20 x .38 Lg, PFH, SS, 100 °	101389 (x3 - to oven)
Combustion Motor Controller (90°, Nat Gas)	HHC-6630-3	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS Nut, #10-32, Serrated Hex Flange, SS	101696 (x4) 100903 (x4)
Combustion Motor Controller (Inline, Nat Gas)	HHC-6630-4	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS Nut, #10-32, Serrated Hex Flange, SS	101696 (x4) 100903 (x4)
Combustion Motor Controller (90°, Propane)	HHC-6630-5	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS Nut, #10-32, Serrated Hex Flange, SS	101696 (x4) 100903 (x4)
Combustion Motor Controller (Inline, Propane)	HHC-6630-6	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS Nut, #10-32, Serrated Hex Flange, SS	101696 (x4) 100903 (x4)
Cover, Blower Insulation, Upper	HHC-6367	See "Blower Motor" hardware	See "Blower Motor"
Fan, Cooling, Lower	100083	Standoff, 10-32 x 1.50 Lg, 3/8 Hex, Stl/Zn Plt Washer, #10 Flat, SS Washer, #10 Split Lock Screw, 10-32 x 2.5 Lg, Hex Head, SS	101927 (x3 - to fan) 102140 (x3 - to bracket) 102350 (x3 - to bracket) 101384 (x3 - to bracket)
Fan, Cooling, Upper	100083	Standoff, 10-32 x 1.50 Lg, 3/8 Hex, Stl/Zn Plt Washer, #10 Flat, SS Washer, #10 Split Lock Screw, 10-32 x 2.5 Lg, Hex Head, SS	101927 (x3 - to fan) 102140 (x3 - to standoff) 102350 (x3 - to standoff) 101384 (x3 - to standoff)
Heat Slinger, Blower, Upper	102708	See "Blower Motor" hardware	See "Blower Motor"
Plate, Blower Motor, Upper	HHC-6405	Screw, 1/4-20 x .50, Hex Serrated Washer Head, SS Spacer, Blower Motor	101394 (x4) NGC-1022 (x4)
Plate, Blower Mounting, Upper	HHC-6404	Screw, 1/4-20 x .50, Hex Serrated Washer Head, SS Spacer, Blower Insulation Cover	101394 (x4) HHC-6366 (x4)
Switch, Momentary, Mushroom (Idle Button)	102831	None	N/A
Thermostat, 120F, Close on Rise	102086	Screw, 6-32 x 3/8, Sht Mtl Drill Point, PPHD, Zinc	101684 (x2)
Wire Harness, Cooling Fan	HHC-6598-2	None	N/A

Replacing Items - Burner Compartment Cover

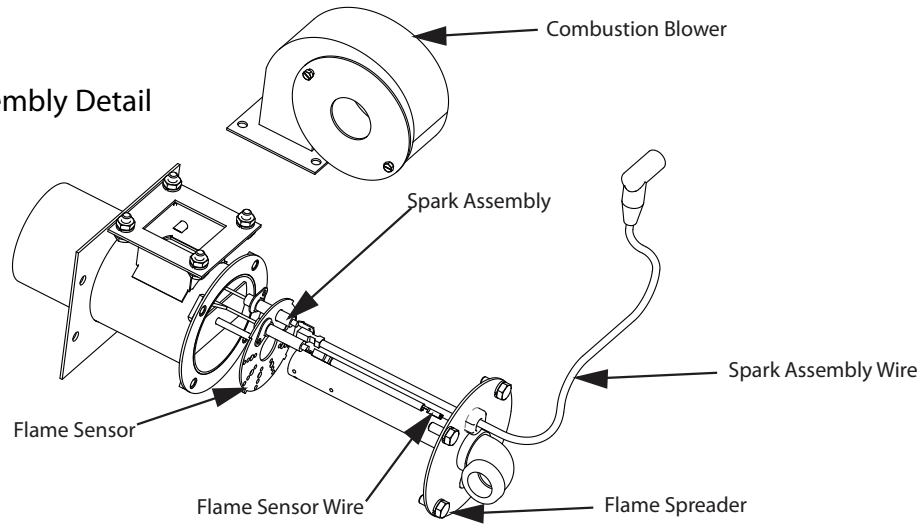
⚠ WARNING: Before removing or replacing any oven component, thoroughly read the safety instructions found at the front of this manual and *Oven Systems* (pages 21-28). Adhere to all precautions and warnings outlined in these sections, as failure to do so could result in serious injury or death.

⚠ CAUTION: Before removing/installing any component, make sure it is disconnected from the wire harness (where applicable).

HHC-6374 (cooling fan tube) and HHC-6137 (burner compartment cover) removed.



Burner Assembly Detail



Item	Part Number	Hardware Description	Hardware Part Number(s)
Air Pressure Switch	102836	Screw, #8 x 3/4, PPHD, Plt-Stl	104178 (x2)
Bracket, Thermostat	HHC-6390	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS	101696 (x2)
Burner Assembly	HHC-6468	Nut, #10-32, Serrated Hex Flange, SS	100903 (x4)
Clamp, Conduit, 1/2 Nominal, Zinc	103632	None	N/A
Combustion Motor (90-degree)	103620	Included	Included
Combustion Motor (Inline) - not pictured	103656	Included	Included
Flame Sensor	103624	None	N/A
Flame Sensor Wire	103575	None	N/A
Flame Spreader	See Burner Assembly	Included	Included
Gas Valve, Modulating	102832	None	N/A
Ignition Module	103626	Screw, 8-32 x 1/2", PPH, SS Standoff, 1/4 Hex, M/F, 8-32 x .50 Lg, Al	101630 (x4) 101946 (x4)
Pipe and Valve Assembly	HHC-6513	Standoff, 5/8 Round, .25 Thru x .75 Lg, Al Clamp, Conduit, 1.00 Screw, #10-32 x 1.5 Lg, SS	101909 (x2) 100133 (x2) 101480 (x2)
Relay, K4, Sealed, 24 VAC, 20A	101275	Screw, 6-32 x 3/8, Sht Mtl Drill Point, PPHD, Zinc	101684 (x2)
Shield, Gas Pipe	HHC-6613	Screw, #8 x 3/8, Sht Mtl, PPHD, Type A, SS	101696 (x2)
Shutter, Inlet Air Blower	HHC-6617	None	N/A
Spark Assembly	103623	None	N/A
Spark Assembly Wire	103574	None	N/A
Thermostat, High Limit	102075	Screw, 6-32 x 1/4 Lg, PPHD, SS	101565 (x2)
Tube, Flexible, Gas, 1/2-Inch	103628	None	N/A
Tube, Flexible, Gas, with LP Orifice	103633	None	N/A
Wire Harness, LOV, Air Switch, 25V	HHC-6599-3	None	N/A
Wire Harness, LOV, High Limit, 25V	HHC-6599-6	None	N/A
Wire Harness, LOV, K4 Ground	HHC-6599-4	None	N/A

Replacing Items - Multiple Panel Removal Required

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⚠ CAUTION: Before removing/installing any component, make sure it is disconnected from the wire harness (where applicable).

Item	Part Number	Hardware Description	Hardware Part Number(s)
Wire Harness, HV, Main	HHC-6598-1	None	N/A
Wire Harness, LOV, Main	HHC-6599-1	None	N/A

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